

**What Building Owners and  
Their Architects knew  
about Mono-Kote MK-3 Fireproofing,  
Asbestos and Asbestos Contamination  
in their Buildings**

*This Review and Analysis has been requested by and is being provided to counsel for the plaintiffs in the bankruptcy litigation of W.R. Grace. As such, the focus of this report will be to identify and include information provided to the building owner, their architects and contractors regarding W.R. Grace's asbestos-containing products, and in particular spray-applied fireproofing produced by the Zonolite Division of W.R. Grace.*

**Jack L. Halliwell, P.E.**

**January 17, 2007**

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**Summary of Qualifications**  
**Jack L. Halliwell, P.E.**

My name is Jack Halliwell, P. E. I am a registered professional engineer, licensed in 16 states. My formal engineering training was in Civil and Environmental Engineering, and the focus my professional work since becoming licensed engineer 23 years ago, has been in the field of indoor air quality. I have been deeply involved in the management of asbestos in large and complex facilities for the past 20 years, and I have taught courses on specialized asbestos abatement and management in highly occupied and sensitive facilities. A copy of my CV is attached in the Appendix of this report that further details this experience.

In addition to asbestos, I have also been, and continue to be involved in indoor air quality diagnostics and management in large buildings. My company, Halliwell Engineering Associates, Inc is comprised of Mechanical, Civil, Environmental Licensed Engineers and licensed architects.

My professional billing rate is \$220 per hour.



Jack L. Halliwell, P.E.  
President  
Halliwell Engineering Associates, Inc.  
January 17, 2007

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"Summary of Information Available to Building Owners and Managers About Asbestos in Buildings, 1970-1995"

### **Introduction/Purpose**

The purpose of this report is to evaluate what building owners and their architects knew about asbestos in Mono-Kote fireproofing MK-3, when they knew it and how they learned of it. In addition, the report will review, analyze and respond to the an October 2005 report prepared by Roger A. Morse AIA entitled, "Summary of Information Available to Building Owners and Managers About Asbestos in Buildings, 1970-1995," and in particular, its opening statement:

**"Building owners were inundated with information about asbestos in buildings to the extent that, by the early to mid-1980's, virtually all buildings owners should have been aware of the widespread use of asbestos-containing materials and the potential risks of those materials in their facilities. This is due in part due to the flood of information coming from public agencies, from the popular press and from trade journals informing building owners about asbestos in buildings."**

### **Section I: Analysis of Morse Report October, 2005**

This first statement characterizes building owners as a monolithic group of people who, as a one dimensional class, all knew, or "should have been aware" of asbestos-containing materials in their buildings and of the potential risks associated with those materials. In our 50 plus years of professional experience as consulting environmental engineers, we have found that building owners are as diverse as the buildings they own, with a wide spectrum of building uses, sizes, locations and complexity. Their ownership include publicly-traded corporations, health care organizations, private companies, school districts, universities, family-owned businesses and individuals. They all own and operate their buildings differently: for different purposes, with different budgets, levels of

expertise and resources. And they get their information from different sources, at different times, and at different speeds. The statement that they "should have been aware" of asbestos, its uses and the risks from those materials "in their facilities" either makes a judgment about them personally, or it makes a major leap in logic that because information was available all members of this class therefore *should have been aware* of it, and *should have* proceeded to survey their facilities for asbestos containing building materials by a date certain, "mid-1980's."

Our experience in this field, with building owners from all of the groups described above, is that they are much more individualistic and unique, than they are similar. And the timing of their knowledge about asbestos, asbestos-containing building materials, health hazards and more specifically about asbestos in their buildings was also unique, individualistic and highly varied.

**"Perhaps more importantly, building owners were obligated by an increasing number of regulations to know about asbestos-containing materials in their buildings. The flood of information and regulations continued throughout the 1980's and into the early to mid-1990's."**

The statement, "building owners were obligated by an increasing number of regulations to know about asbestos containing materials in their buildings." implies that regulations were/are in place that require building owners to survey their facilities for asbestos containing building materials (ACBM). This is misleading and in many case, untrue. Again, there is a high degree of variability of exactly what federal (EPA and OSHA) regulations require of different building owners in terms requiring knowledge of ACBM in their buildings . For example, K-12 school Districts were required, starting in 1987 to survey their school buildings for ACBM, and to develop Management Plans that would detail the required Response Actions, based upon the results of the Survey and the Management Plan's Risk Assessment. This regulation only affected K-12 Schools and was promulgated under EPA's Asbestos Hazard Emergency Response Act (AHERA). It did not affect the owners of colleges or universities, commercial or institutional buildings. Those building owners had different, and lesser requirements (and timetables for learning about ACBM in their facilities) place upon them by federal regulations.

What is interesting to note is that when the US Congress passed this "Emergency" AHERA law in October of 1986, it was almost 14 years after OSHA had passed their first Standard for occupational exposure to airborne asbestos and more than 12 years after EPA had banned spray-applied asbestos fireproofing. Evidently Congress felt that school districts hadn't become aware over those 12 to 14 year periods that they were "obligated by an increasing number of regulations to know about asbestos-containing materials in their buildings."

Further, Congress nor EPA chose to extend the AHERA requirements of performing asbestos surveys and developing management plans to commercial or institutional buildings. This meant that the owners of those buildings (approximately 750,000 according to EPA), were not specifically obligated by federal asbestos regulations to survey the amount, locations or condition of ACBM throughout their facilities, by any required date. In fact, many of those owners would only learn of the existence of ACBM in their facilities, because they were about to embark upon renovations or interior demolitions that raised the awareness of astute architects, engineers, contractors or facility managers. EPA's NESHAP regulations later required that buildings be surveyed for ACBM prior to renovations that could disturb more than 160 square feet, 260 linear feet or 3 cubic feet of ACBM. Owners would at those times of renovation, be required to learn of the presence of asbestos...but only for the area of renovation, and not for the entire facility.

In summary, what has actually transpired since the first federal regulations dealing with controlling asbestos were passed in the early 1970's through today, has been a **process of evolving awareness** by building owners and managers about asbestos, asbestos containing building products, health effects and the specific locations, quantities and conditions of asbestos and asbestos contamination in *their* buildings. This is evidenced by the fact that NESHAP asbestos surveys to identify ACBM locations prior to renovations in buildings are still required, enforced and performed in significant quantities today before building renovations are allowed to proceed. And asbestos surveys are required by lending institutions as part of due diligence before financing commercial property loans.

The fact is that not all building owners or their managers were aware of the presence of asbestos in their facilities by the mid-1980's and that awareness and process of discovering asbestos locations in buildings still continues today: AHERA surveys didn't start identifying ACBM's in schools until 1987; Commercial and Institutional Buildings aren't required to survey their facilities for ACBM's until they are planning large scale renovations, and even then they don't have to survey the entire facility; and NESHAP Surveys to identify asbestos in commercial buildings continue today (Halliwell Engineering Associates performed over 100 asbestos surveys in the last 4 years to identify the presence of ACBM's).

In our own experience in the asbestos field, which spans approximately 20 years, we have found that a building owner's knowledge of asbestos, ACBM, asbestos-related health effects and the presence of ACBM and asbestos contamination in *their* buildings is often an individualized process.

The model of building owners as a single class becoming aware of these issues within a defined period of time, is really confined to K-12 School Districts that complied with AHERA. The enormous remainder of entities covered by the large umbrella classification

of "Building Owners" have, in our experience, become aware of these issues in layers. There seems to have been a varying but general knowledge of asbestos as a hazardous material, and sometimes a knowledge that asbestos was contained in specific building products. However, knowledge of the presence of asbestos throughout their facilities, its location, quantity, condition as well as the presence of any asbestos contamination (asbestos fibers that had become free of the matrix of the building material they were originally part of) was generally not obtained until an asbestos survey was commissioned and its findings reported. It has also been our experience that in the majority of asbestos surveys we have performed or encountered, the triggering event for those surveys was a large scale renovation within the building. These renovations, therefore became the primary "triggering events" for owners to become aware of asbestos and asbestos contamination in their buildings, as a result of EPA's NESHAP requirements.

As these renovations occurred at different times, in different buildings across the US, this large class of building owners became aware of asbestos, ACBM and asbestos contamination in their facilities, *not* by an arbitrary date or deadline, but instead based upon the dates that their individual facilities were about to be renovated, sold or demolished. And the dates and these circumstances under which, and when they account, vary significantly from facility to facility and from owner to owner.

## **Section II: Follow-On Document Search/Review**

Throughout our 20 year experience with asbestos in buildings, we have had the opportunity to work in some of the largest and most complex facilities in the country. What we found both interesting and surprising in working with even the most sophisticated building owners, was that many of them were not aware that the building products in their facilities contained asbestos, until those materials were surveyed and sampled for asbestos content. Prior to those surveys, generally triggered by large planned renovations, there was little to no knowledge about what building products in their facilities did or did not contain asbestos. There was little to no information in the As-Built Drawings for the facilities, in the project specifications or in the product submittal files for the construction of the buildings.

We wanted to explore why this information was not part of the original construction records: why the architects, engineers or contractors were apparently unaware of it and why building owners were unaware of it for such long periods of time.

In an effort to answer these and other questions, we conducted a literature search of information that would have been available to architects, engineers and contractors from the period that asbestos in building products and its health effects first appeared in the New Yorker Magazine (1968) to the time that EPA first banned spray-applied asbestos fireproofing. For this 6 year time frame, we identified and performed a review of those

information sources that architects, engineers and contractors would most likely be using to obtain information on building design and building products. Since architects traditionally have the design responsibility for fire ratings and specifying fireproofing in buildings, we focused our search on those periodicals that architects had available to them at that time for this information.

We researched the primary professional publications that architects would read during that 6 year period: Architectural Record, Progressive Architecture and Architectural Forum. We also researched Engineering News Record, a weekly publication of McGraw-Hill in New York City (publisher of Sweets Catalog as well) which is well read by the engineering and construction community.

In addition, to researching information and articles on ACM, we also sought advertisements for W.R Grace building products, and in particular Zonolite products during that time frame in order to determine what information they were providing to the building community about asbestos.

We also researched Sweets Catalog for Zonolite products during this same timeframe, for the same purpose.

Finally, we organized all of this information chronologically in an effort to recreate the information environment of that period, to reconstruct the information flow that architects, engineers, contractors and building owners would have experienced as they conducted their business of designing and constructing buildings, as well as specifying materials for those buildings.

### **Findings: Architectural/Engineering/Construction Publications 1968-1973**

What we found has been summarized below:

- 1) During the period of 1968-1973, construction products information was obtained by architects in a number of ways that are different than today. Specifically, products were introduced in professional periodicals by in articles or by advertisement. The advertisements would have a reader circle card printed in the ad that could be cut out and mailed to the manufacturer in order to have a sales representative contact the architect.
- 2) The state of the architectural and specification writing professions at that time were chronicled in a monthly column in the magazine, Progressive Architecture. Harold Rosen, the chief specification writer for Skidmore Owings & Merrill of New York City. In March of 1964, Mr. Rosen opined on the changing landscape of building products specification and the



implied dependence on manufacturers' representatives when he wrote, "...the chemical industry has been engaged since World War II in creating building products out of raw chemical materials. The behavior of these products, either singly or in combination with other materials as components of construction details, remains largely outside the educational and practical experience of architects. In addition, CSI (Construction Specifications Institute) is interested in extending the knowledge of these new materials on the part of practicing specification writers. This involves a number of problems. For one thing, specification writers and architects are constantly deluged by a flood of literature on these new materials. How is information on these new materials obtained, filed and retrieved?"

Five years later, in April of 1969, Mr. Rosen's column was still discussing the same problem of architects researching information on building product literature, "At the fall conference of the Building Research Institute on the subject of information retrieval, several speakers pointed out that architects and engineers spend about 20 % of their time searching for information. Architects and engineers must have access to three major areas of information in order to design and specify. These areas include building science, product literature and codes."

- 3) Less than one year following writing that column, Mr. Rosen was writing one of the first articles in the country in an Architectural Magazine about his opinion that, "due to its contribution to air pollution, asbestos-sprayed insulation must be eliminated in future construction." In his February 1970 "Specifications Clinic" column, which appeared monthly in Progressive Architecture Magazine, Mr. Rosen wrote:

"A more striking example of how architects can reduce pollution that actually contributes to fatalities is in the selection of certain sprayed-on fire proofing and insulating products. On high rise structures in urban areas, spray asbestos fireproofing has been found three and four blocks from the construction site, so that the unsuspecting general public is likewise subjected to this hazard as well as the tradesmen directly involved in its application. While this relationship between a casual encounter with asbestos and the possible development of disease in the public has not been established, it behooves the architectural profession to consider other materials to perform the work of sprayed-on fireproofing and insulation.

Not only is there a clear and present danger in the initial application of asbestos on the health of the installers, but 30 or 40 years hence (2000-2010), when these buildings are torn down, the demolition operations, if

not properly controlled, will add more asbestos fibers to the atmosphere. The time to use substitutes for asbestos-sprayed insulation is now."

- 4) Following Mr. Rosen's February 1970 column, there was an intense amount of activity in the construction press and in New York City with regards to spray-applied asbestos fireproofing.
- 5) On April 2nd, two months after Rosen's column, Engineering News Record ran a cover article entitled, "Does sprayed asbestos cause lung cancer?" The inside article, entitled, "Loose asbestos fiber seen as a cancer threat to men in building trades" described "strong evidence that sprayed asbestos used in fireproofing steel framed buildings causes cancer in men who work on these buildings. The most likely victims are the men who spray the asbestos mixture on exposed steel members and ductwork and apparently inhaled the heaviest amount of the asbestos fiber."
- 6) Eleven days later (April 13th) the City of New York issued the first regulations in the country to control the spraying of asbestos fireproofing. The interim regulations were issued by the city's Department of Air Resources in the Environmental Protection Administration, and set forth requirements to control (but not ban) the spray application of asbestos fireproofing.
- 7) On May 7th, ENR reported that asbestos spray fireproofing operations had been halted at 4 buildings under construction, including the two World Trade Center Towers.
- 8) On May 28th, ENR reported that the city of New York was considering banning the application of spray-applied asbestos fireproofing.
- 9) On June 4th, ENR reported on public hearings in New York city regarding the new asbestos spray regulations and the possibility that the city may ban asbestos spray fireproofing in the future. The article also reported that the fireproofing operations at the World Trade Center had resumed, now using a non-asbestos material.
- 10) On July 2nd, ENR reported that the California State Division of Industrial Safety had recently issued guidelines on the use of sprayed fireproofing material.

- 11) In his July column of "Specification Clinic in Progressive Architecture, Harold Rosen returned to the issue of asbestos fireproofing in his feature entitled, "Hazardous Materials."

Last February this column pointed out the hazards in the use of spray-asbestos insulation. The New York City Air Resources Commission has since instituted strict controls in the application of spray-applied asbestos fire protection to protect both the installers and the unsuspecting public..... It is essential that manufacturers recognize these problems and develop precautionary programs to reduce and minimize these hazards..."

- 12) On November 26th, ENR reported that the New York City Environmental Protection Administration had proposed an "anti-air pollution code" that would ban spraying asbestos fibers on steel framed buildings in the city.
- 13) In its December issue, Architectural Forum Magazine ran an in-depth article in its "Technology" Column entitled, Spray fireproofing faces controls or ban as research links asbestos to cancer.

The article reported on the work of Dr. Selikoff and how it had little impact upon the city until the unions and the city's new Environmental Protection Administration joined forces to develop spray control regulations. "Whether or not a complete ban is required for public safety is highly disputable. But since no one know the human tolerance for asbestos fibers in the lungs, the city has decided to err on the side of safety (with a proposed ban on the material). Until the ban, however, the word is control." The article went on to discuss the use of non-asbestos alternatives and the amount of construction work affected. "Today asbestos spraying has resumed on 25 city construction sites..."The report continued with a discussion on the World Trade Center's switch to using Cafco Blaze-Shield Type D C/F, the only commercially available direct to steel spray, according to the manufacturer. "Cafco D C/F does not yet have the full approval of the city's department of buildings. It has approval for columns and not yet for decks pending formula analysis.

In fact, except for the Port Authority, which is exempt from the city code authority, no builder in New York has any choice to spray with asbestos or close down construction. There is no substitute material yet that has full city approval. Other materials than Cafco are coming along however. About six other manufacturers including Johns Manville and the WR Grace Co. are developing non asbestos spray fireproofing for structural steel. But none of these is past the development stage."

- 14) In its December 24th issue, ENR reported that the city of Philadelphia's board of Health had banned spray-applied asbestos fireproofing, and that the ban would become law in about two months.
- 15) In its March 11th, 1971 issue, ENR reported in an article entitled: "Asbestos group backs strict control of spray jobs."

"The producers of asbestos products last week backed stringent enforcement of regulations for the spraying of asbestos insulation, but denied there is a ban on asbestos spraying.

The statements were made by the Asbestos Information Association, an organization formed this year by eight asbestos product manufacturers, at a press conference in New York City.

William P. Raines, director of public relations for Johns-Manville Corp., said that current regulations set safe levels for construction workers who spray asbestos, and that sprayed asbestos poses no threat to the health of the general public."

#### **Findings: WR Grace/Zonolite Division product information on Monokote Fireproofing**

In order to determine what information was available to building owners, their designers and contractors regarding the asbestos content of Monokote Fireproofing during this period (1968-1973), we researched the available product literature in Sweets Catalog, as well as the product advertisements in the design and construction publications previously cited.

**Advertisements:** For this period, we found two product advertisements for Monokote, both occurring in Engineering News Record (ENR) and both occurring in 1970. The first appeared in the August 20th, 1970 issue of ENR. It was a full page ad, with the following copy regarding its resistance to erosion, "Other features? Indeed! Like zero erosion, after being tested in 100 mph winds for 87 hours. Result: No "dusting" in air conditioning and ventilating systems."

The significance of this ad copy, in light of the asbestos health effects information published that same year was the implied rationale that with "zero erosion" and "no dusting" that designers and owners could expect no contamination of asbestos fibers in the building from the fireproofing, assuming that if the designers were aware or concerned that Monokote contained asbestos.

The second ad appeared in the November 19th, 1970 issue of ENR. It too was a full-page ad that headlined, "Nobody...but nobody...understands fireproofing like the Zonolite man-on-the job." The text read, "...They know there's no more critical business than fireproofing. That the most minute detail can be crucial to human life and economic cost. They keep up with changing fireproofing procedure. And with continually improving products."

The significance of this ad copy was the assurance of the Zonolite representative to be fully knowledgeable about the Monokote product and the reliance at that time of designers on product representatives as explained in Harold Rosen's "Specification Clinic" column, to provide the critical information from the chemical industry that "remains largely outside the educational and practical experience of architects."

However, neither ad provided any information as to whether Monokote did or did not contain asbestos.

**Sweets Catalog:** A review of the Sweets Catalog of building products for the period of 1968- 1973 is also revealing in how little information was provided to owners and their designers regarding asbestos content in Monokote. The only year that any information was provided about asbestos content, was in the 1971 edition. **"Pollution and Health"** Because of the constantly-changing conditions involving fireproofing and its relation to pollution and health, we recommend that you contact your Zonolite sales office for the latest data on these subjects. Recent tests at Underwriter's Laboratories, Inc., have provided some fire ratings on an asbestos-free formula of Monokote. Other tests and ratings will follow.

Existing Formulations of Monokote contain minimal amounts of asbestos which are "locked in" during the mixing process. Monokote is wet mixed, pumped and sprayed, and hardens to a cementitious mass. Job-site tests show air fiber counts well below occupational threshold values proposed by governmental bodies."

The significance of this information, was that this was the only year in this period of our search that we could locate information regarding asbestos content in Monokote, and that information indicated to building owners and their designers that the asbestos content was "minimal" that the asbestos fibers were "locked in" the fireproofing and that the product dries to a "cementitious mass." From this information, a designer or owner might reasonably conclude that the release of asbestos fibers into the building's air would not be an issue, and that contamination of the building from asbestos fibers released from the fireproofing would not be a concern.

The Monokote information in Sweets Catalog also includes a sample specification for the designer to use , which include a sample performance specification on acceptance criteria that states, "The fireproofing material shall not be subject to losses from the finished application by sifting, flaking or dusting. This performance shall be measured by the results of a test for erosion resistance when subjected to high velocity air flow across the surface of dried samples."

**The significance of this sample specification is that Grace was giving the designer a specification for a Monokote product that was making claims to resistance to air erosion at high velocity air streams, thereby implying that asbestos fiber release and subsequent asbestos contamination of the building , would not be a problem if Monokote was specified.**

### **Section III: W.R. Grace Zonolite Divisions Sales Representatives**

#### **Findings: WR Grace/Zonolite Corporation Sales Representatives product knowledge of Monokote Fireproofing, Asbestos Content and/or Health Hazards of Asbestos**

Based upon the preceding review of WR Grace/Zonolite product literature, and specifically the lack of information in that literature regarding the asbestos content of Monokote Fireproofing during this period, we turned our research focus to learning what the WR Grace/Zonolite Sales representatives knew about these issues at that time (1968-1973). We were interested in finding what information the Grace sales representatives had obtained from the company, and what they were telling their customers about two relevant issues:

- 1) What was the asbestos content of asbestos fireproofing?
- 2) What were the health hazards/concerns regarding asbestos fibers?

In order to obtain this information, we asked counsel for the plaintiffs to provide us with copies of any depositions of WR Grace/Zonolite Corporation's Sales Representatives that they had access to, and who were in the company's employ during the period of 1968-1973. We also asked for any depositions of spray applicators who had experience with Monokote Fireproofing during that same period.

We received from counsel, eight depositions of WR Grace/Zonolite Salespeople and four depositions of spray applicators who all had experience either selling or applying Monokote Fireproofing during the period of 1969-1973. We were particularly interested in the product knowledge of the sales team, based upon Grace's representations in the ENR advertisements. Below are the results of our review of these depositions, as provided in text excerpts of the sales person's own words.

**WR Grace/Zonolite Sales Representatives:**

**1) Wilfred Archambo:**

**Salesman 1961-1987; Architectural Representative 1968-1975; Dealer  
Architectural Representative 1976-1987  
Sales territory included Eastern Massachusetts, Connecticut, Rhode Island,  
New Hampshire, Vermont and Maine  
Deposition taken 4/24/95 in Boston, Massachusetts (D-1)**

Q. Do you know whether the Monokote was applied in the Connecticut Mutual building contained asbestos or not?

A. I have to say no.

Q. Assume that the building was constructed between 1970 and 1972. Based on that assumption, Mr. Archambo, do you know whether the product would have contained asbestos or not?

A. In that period of time Monokote-3 had a small amount of asbestos in it. But as a product applied in a wet cementitious mixture, there was nothing to be concerned about.

Q. Then I'll go back to my original question. Assume the building was constructed between 1970 and 1972. Do you know whether or not it would have gotten Monokote with asbestos or Monokote without asbestos?

A. It would have got both.

Q. How so?

A. Monokote-4 was approved for beams and columns; Monokote-3 was designed for both but also roof decks.

Q. Mr. Archambo, it is my understanding that sometime in 1969 you first received information that Monokote-3 contained asbestos.

Q. Is that correct?

A. Yes, sir.



Q. What was the source of your information? Mr. James Cintani?

A. I would say Cintani." The question was asked: "Why don't you tell me what the circumstances of this communication was?

A. The communication I recall is that we were doing a job in New York City and at that time they indicated that MK-3 was found to have asbestos in it and that a test was done with an air sampling and provided the end result of the test and showed that there was not a sufficient enough asbestos level to cause any concern."

Q. Yes, sir. But I mean did you tell them Monokote has these ingredients? How did you come to tell them that it had asbestos in it?

A. The caption that I would recall was something like this: Monokote has a small amount of asbestos as a binder and when applied in a wet form like oatmeal, it has no bearing on any asbestos being airborne, in comparison to that of the competition, which is all feathers.

Q. So in the early '60s when you started selling Monokote you began selling architects that it contained asbestos but that it was locked in?

A. I believe I told them it was a cementitious mixture, and that's what I used. And if they asked me what it was, I would tell them.

Q. In the early '60s when you began selling Monokote did you tell architects that it had a small amount of asbestos in it but that when it was wet-applied, that the fireproofing fiber was locked into the product?

A. I would tell them it's a cementitious mixture which when applied wet has a bonding strength far superior to the competition.

Q. Did you tell them it had asbestos?

A. I didn't tell everybody that.

Q. How did you decide who to tell and who not to tell?

A. It was when the fibers were up against me, when I was up against fibers.

Q. You mean up against your competition?

A. The competition was in the ranks as better or equal.

Q. Then you would tell them that your fireproofing also had asbestos in it as well?

A. Yes, sir.

Q. Now, I know it's been a long time. Am I correct, Mr. Archambo, that when you were in competition with the sprayed fiber material made by others, you would tell the architect that your product had asbestos in it but that when it was applied in a building the fibers were locked up into the product and were not capable of being loosened like your competition's. Is that correct?

A. Yes, sir.

2) Allan Mann:

**Salesman 1963-1974**

**Sales territory covered Minnesota**

**Deposition taken 8/8/91 in Minneapolis, Minnesota (D-2)**

Q. So after '67 or '68 then you became a direct employee of W. R. Grace?

A. That's right.

Q. All right. And the Mono-Kote that you sold in the 1960s for W. R. Grace, was that a product called Mono-Kote 3?

A. That's right.

Q. Did Mono-Kote 3 contain asbestos?

A. some, yes.

Q. Do you know how much asbestos Mono-Kote 3 contained?

A. Well, I think it's pretty much between about 10, 12 percent, right in that range.

Q. Let's look at Deposition Exhibit 342 which is the 1971 Grace Sweet's brochure. First of all, are you aware of the statement "Pollution And Health" which appears in the brochure which is copyrighted, for the record, October 1970?

Q. And what was your understanding of Grace's position on health hazards from Mono-Kote 3?

A. Very minimal because the fiber was locked in the product. It was a wet mix, applied, and there was no blow-off, this type of thing.

Q. And then your understanding of Grace's position was that there was a minimal health hazard or no health hazard?

A. Minimal.

Q. Minimal health hazard?

A. Yup.

Q. Was that health hazard only to applicators or was it a health hazard to people in the building once Mono-Kote had been sprayed?

A. There was no health hazard as far as occupants of a building are concerned or the people applying it.

Q. And that is the information that you would have given to anyone who asked you in 1971?

A. It is.

Q. Mr. Mann, did you expect architects to rely on the information in Grace brochures?

A. I think the architects relied on our literature. I mean, we were known as fireproofing experts, so to speak, and they relied on our literature.

**3) Charles William Guenther:**

**Salesman 1965-1971; Architectural Representative 1971-1974**

**Sales Territory included Southern Illinois, Western Kentucky and the St. Louis area.**

**Deposition taken 9/12/89 in St. Louis, Missouri (D-3)**

Q. Is there any time you were employed with W.R. Grace that you ever discussed health issues with an architect or asbestos containing fireproofing?

A. No.

Q. During the entire time you worked for W.R. Grace did you ever discuss with anybody any health issues that related to asbestos containing building products?

A. No.

Q. Do you know what the difference is between Monokote 3 and Monokote 4?

A. All I know is the number changed.

Q. Are you saying you don't know what the difference is between Monokote 3 and Monokote 4?

A. I have no information on formulations of Monokote at all.

Q. Is there no aspect of the formulation that you have any knowledge of, comparing Monokote 3 to Monokote 4?

A. Like I say, the formulations I have no knowledge of.

Q. Do one of those 2 products contain asbestos as a component?

A. Yes. Monokote 3 contained –

Q. You say Monokote 3 contained asbestos?

A. Yes, I think that is correct.

Q. Let me rephrase the question. During the time that you sold Monokote 3, do you remember hearing about health hazards that would result from being exposed to asbestos?

A. No. Not that I recall.

Q. At any time while you were employed by W.R. Grace did anyone ever tell you that there was or could be a health hazard if Monokote 3 were disturbed?

A. Not that I recall.

Q. While you were employed by W.R. Grace did anyone ever tell you that there would be a health hazard if Monokote 3 were damaged?

A. Not that I recall.

4) Samuel Lee Templeton:

**Sales Representative: 1959 to and through the date of deposition (1/4/84)**

**Sales Territory covered the Atlanta Georgia Area**

**Deposition taken 1/4/84 in Greenville South Carolina (D-4)**

Q. When was the first time that you became aware of the alleged health affects of asbestos?

A. When the letter came down to take out asbestos in the material.

Q. Was that a letter from the main offices?

A. (Witness nods head in the affirmative), that the material would have no asbestos in it.

Q. Which materials?

A. Monokote.

Q. Who wrote the letter?

A. I don't remember.

Q. Was it a letter set to sales representatives, or was the letter aimed at the customer?

A. Salespeople.

Q. Did you provide copies of that letter to your customers?

A. No, ma'am.

Q. Did you notify your customers that asbestos was being taken out of Monokote?

A. When I was asked, yes.

Q. What was your understanding as to the reason for removing asbestos from Monokote?

A. Because of the constant approach to the market of the material having the asbestos in it.

Q. Could you explain that further.

A. We were told that no longer would we have asbestos in our material; that the Government said that no asbestos would be in any material whatsoever.

Q. Did you know prior to getting that letter that there was asbestos in the material?

A. I did not.

Q. So it is your testimony when you received that letter that was the first you had heard about Monokote containing asbestos?

A. Right.



**5) Elijah David Bossier:**

**Sales Representative 1959-1968 ; District Sales Manager 1968- 1984 (retired)  
Sales Territory included Baton Rouge and New Orleans, Louisiana  
Deposition taken 6/15/89 in Kenner, Louisiana (D-5)**

Q .Did any fireproofing product ever asbestos?

A. Not to my knowledge. See, they had these formulas they went by. I was never privileged to even look at one, so I don't know what went in them. I k now they had vermiculite as the bulk, the fill.

Q. In the Monokote?

A. In the Monokote. Vermiculite and the binder was gypsum, and after that I don't know what went in it. And the only reason I know that is because you just, you know, had to have a bind; otherwise, it would falloff. And it had to have a filler, and I knew vermiculite went in. But what else they put in there I have no idea.

Q. Well, did you ever become aware that Monokote contained asbestos?

A. Not to my knowledge.

Q. Do you have any knowledge of that today as to whether Monokote contained asbestos?

A. Well, When they -- When the federal government became concerned about asbestos, Grace To my knowledge research and development moved and met all the qualifications of the EPA or OSHA or whatever. And it was said that they didn't want any asbestos in Monokote. So what they did about taking it out, I don't know. Whatever they put there and gave me literature on, I sold. Now, I went out and sold it, and that was my job. And if I had -- r wouldn't have been able to do my job if I had to fool around with theirs.

Q. With whose?

A. Production.

Q. Have you ever heard, Mr. Bossier, anything about any health hazards associated with asbestos in building materials?

A. You mean do I know of anybody that got sick or anything like that? I know that I know that asbestos is dangerous. I mean, Johns-Manville went through all that. I know asbestos is dangerous, but I don't know of anybody that ever caused any problem.

Q. Have you known that it's dangerous for some time?

A. Whenever the federal government said it was dangerous, well, then that's when I found out. Other than that, I didn't know. When they said you got to come up with standards in fireproofing whatever, when they said that, well, then I knew. Other than that, I didn't know.

Q. And so your testimony then is that way that you sold Monokote-3?

A. Yeah.

Q. Is it your testimony that that would be true with respect to all the salesmen that worked under your supervision?

MR. WEIGEL:

I have to object to the form. I don't know whether he can say --

THE WITNESS;

I'm not sure just how they sold it. I wasn't with them all the time. We sold Monokote. Whatever one we had, whether it was Monokote-3 or Monokote-5, we sold it to the architects, and we performed a service. We didn't go into this asbestos stuff.

Q. When they went in to sell Monokote-5, did you or they ever discuss the fact that Monokote-5 did not contain asbestos?

MR. WEIGEL:

Objection as to form.

THE WITNESS:

We sold Monokote, whatever one that was there. We sold it the same way. We didn't know anything about the asbestos part of the thing. Now, I'm sure Cambridge found out about it, and they changed the formula. It wasn't any use in bringing all that stuff up to an architect. He didn't care about it either.

Q. Did architects ask you --

A. I never recall an architect asking me.

Q. During the period 1968 to 1972, did any architect ask you about asbestos in a Monokote?

A. Not that I can recall.

6) Harold D. Bishop:

**Assistant Plant Manager (Zonolite Cincinnati Plant) 1957-1963; Salesman 1963-1976**

**Sales Territory covered Indiana**

**Deposition taken 5/13/92 in Chicago, Illinois**

Q. Did you have an understanding that the 'fireproofing products, the Mono-Kote, contained asbestos?

A. No, I did not.

Q You did not know that they contained asbestos?

A I had no understanding that they contained asbestos.

Q. Okay. Have you not "read 'anything, any literature or documents or anything, which would indicate that Mono-Kote during the '67 to '72 time period contained asbestos?

A No.

Q. You don't know whether MK-3 contained asbestos?

A. No.

Q. You don't know whether MK-4 contained asbestos?

A. No.

7) P.J. Lyons:

**1969-1975 Salesman (Grace Building Products Division); 1975-1989 Grace Horticultural Products Division; 1989-  
Deposition Salesman for Grace Sierra Corp  
Sales Territory included Chicago District  
Deposition taken 5/19/92 (D-7)**

Q Sir, are you aware of whether or not MK-3 contained asbestos?

A I do not believe it did.

Q How about MK-4?

A I do not believe it did.

Q What about MK-2?

A I do not believe it did.

Q Okay. How about MK-1?

A I do not believe it did.

Q How about MK-5?

A I do not know.

Q Do you recall any controversy surrounding health hazards associated with the asbestos in the non-cementitious products?

A I don't.

A I, as a salesperson, and our company in general, had a philosophy following the requirements of a building structure with documents, and they were held in public trust. Hence, you did not improvise upon the safety of someone living in a building in the future, so you did not improvise.

Q . Okay, sir...

And along those lines, if you, as a salesperson, had had information that any of the products that you sold would be hazardous to anyone's health in any way, would you not have sold that product?

MS. XORNICBUK: Object to the form of the question.

Go ahead.

A I think that's a correct statement.

Q Okay. If Grace -- and I 'm talking about the leadership that you just referred to, the hierarchy. If they had had knowledge of a potentially-hazardous ingredient in any of their products that you were selling, I -- take it, then, you would have expected that they would have made you aware of that?

A Correct.

Q. Do you recall that there was a time---regardless of whether you can recall actually when, what year, do you recall that there was a point in time in which you routinely had discussions with your customers regarding whether or not the product contained asbestos?

A I believe -- I do not believe we ever had discussions with our customers with respect to the use of asbestos in Grace Mono-Kote product.

Q You would have no knowledge of whether asbestos-containing Mono-Kote performed better than a non-asbestos-containing Mono-Kote?

A Correct.

Q That's because you don't know whether it ever contained asbestos?

A Correct.

Q Okay. So you don't recall that it contained asbestos; you don't think it did?

A Correct.

Q Okay. Do you recall if the bags of Mono-Kote themselves indicated anywhere on them whether or not they contained asbestos?

A I do not believe they did.

Q How about the invoices?

A I do not believe they did.

Q. Okay. To your knowledge, is there any way that an architect or a contractor, using the Mono-Kote product, would know that the particular product contained asbestos if it did?

A. I don't believe he would.

8) Glen Carpenter:

**Salesman , Architectural Representative 1949-1973**  
**Territory included Western Minnesota and North Dakota**  
**Deposition taken 9/21/87 (D-8)**

Q. Did anyone at Western Mineral tell you that Asbestos was harmful?

A. No.

Q. Did anyone at W.R. Grace tell you that asbestos was harmful?

A. No.

Q. Do you recall whether anyone asked how to respond to customers if the subject of asbestos was raised to them in the course of their selling product?

A. No. I don't recall any reference at all to that. Probably purposely they didn't mention it.



### **Summary of WR Grace/Zonolite Sales Representatives Deposition Reviews:**

Based upon our review of the depositions of these 8 different sales representatives, we have summarized their testimony and implied knowledge about Monokote and asbestos during the 1968-1973 period as follows:

- 1) Six of the eight sales representatives (75%) stated that they were unaware of the fact that Monokote (3) contained asbestos; and that they had not been told by anyone from the company of Mono-Kote MK-3's asbestos content.
- 2) All of the sales representatives (100%) testified that they had not received any information from the company with regards to the health hazards of asbestos during this time frame, and that any information they received about asbestos and health came from other sources, after asbestos was banned from spray applied fireproofing.
- 3) Of the two sales representatives (25%) that said they were aware that Mono-Kote MK3 contained asbestos, (Wilfred G. Archambo and Allan Mann) they testified that they told architects that , "...as a product applied in a wet cementitious mixture, there was nothing to be concerned about." and that, "There was no health hazard as far as occupants of a building are concerned or the people applying it... because the fiber was locked in the product. It was a met mix, applied and there was no blow off, that sort of thing."
- 4) With regards to what the sales representative told architects about asbestos in Monokote, those who said they were unaware of it, told the architects nothing. Those who were aware of it, only discussed it with the architects when they brought the issue up, or when they were in competition with another fireproofing manufacturer whose products were asbestos-free. In those situations, the two Grace/Zonolite sales representatives would tell the architects that the asbestos fibers were bound into the cementitious mix of the fireproofing, and there was no concern, since they were "locked-in."

#### **Section IV: Mono-Kote MK-3 Applicators**

##### **Findings: Fireproofing Applicators' Knowledge of Monokote Fireproofing ; Asbestos Content and Health Hazards (1968-1973)**

Following our review of the information WR Grace/Zonolite Sales Representatives had regarding the asbestos content of Monokote Fireproofing and/or the Health Hazards of Asbestos, we next were interested in what knowledge the applicators themselves may have had on these issues. We requested plaintiffs counsel to provide us with copies of any depositions they had from fireproofing applicators with Monokote experience during the time period of 1968-1973. Here are the results of that review, as presented first in the applicators own words.

##### **1) Hal Y. Garrrrett:**

**President, Central Concrete and Plaster; Central, South Carolina.  
35 Years experience with this company at the time of his deposition (1989)**

Q. Were you ever aware of any problems associated with Mono Kote?

A. Would you be more specific when you say problems?

Q. Were you ever aware of any kind of health problems?

A. No.

Q. Were you ever aware that Mono Kote at one time contained asbestos?

A. No. Not until after the federal government came out publicly that the asbestos fibers were detrimental to your health was I aware that Mono Kote contained asbestos.

**2) Creighton Crowe:**

**Sweeney Plastering (1962-1977) Massachusetts  
1959-1962, Self employed Plasterer;  
1962-1977 Outside Supervisor for Sweeney Plastering;  
1977-182 Consultant for Silpro Stucco Products**

Q. Okay. Have you ever come to learn at any time, while using Monokote, that Monokote fireproofing contained asbestos?

A. I never knew it, no.

Q. Okay. Did you recently learn that Monokote fireproofing contained asbestos?

A. I did.

Q. Okay. Can you tell me how you learned that Monokote contained asbestos?

A. Through my lawyer here.

Q. Your lawyer, Rodney Pillsbury?

A. Uh-huh (affirmative). Rodney Pillsbury, yes.

Q. Do you recall approximately when Mr. Pillsbury told you that Monokote contained asbestos?

A. Last fall, in September or October, around there somewhere.

Q. Okay. At any time were you ever warned by W.R. Grace that Monokote contained asbestos?

A. No.

Q. At any time did anyone from W.R. Grace ever advise you to take special precautions when working with Monokote because of its asbestos content?

A. No.

**3) Richard Connor:**

**President, Francis P. Connor and Son, Inc; Nashua, New Hampshire  
38 years experience with that company at the time of his deposition (1990)**

Q. When did you first become concerned about using asbestos products in construction?

A. I would say the middle to the end of the seventies.

Q. And why did you become concerned about it at that point?

A. Everything I read about it.

Q. In the newspaper you mean?

A. Newspapers, magazines.

Q. Was there –

A. And of course, the government came out – OSHA or somebody, I don't know, some regulatory agency come out and banned it.

Q. Was there ever any other reason why you became concerned about asbestos in building materials

A. No.

Q. Were you aware in the sixties that fireproofing material for steel structures generally contained asbestos?

A. Yes.

Q. Were you ever told or led to believe that Monokote did not contain asbestos?

A. No, I don't remember.

Q. So before when you told me that – about when you first learned that Monokote had asbestos, is it – is it fair to say that what you meant to say was that during the sixties and early seventies, you didn't know one way or another whether Monokote contained asbestos?

A. Yeah; I never gave it a thought. Didn't – wouldn't matter.

Q. But in fact, you did know that most fireproofing material did contain asbestos in that time frame?

A. Well, the asbestos – the mineral fiber products, yes.

Q. And – and no one ever told you that Monokote did not contain asbestos?

A. No.

**4) Ross Lee:**

**President, Ross Lee Plastering, Los Angeles, California  
46 years experience with that company at the time of his deposition (1992)**

Q. Looking at the list of products, do you see any products that you associate as being asbestos-containing products?

A. Yes.

Q. What is that?

A. Well, there's two of them that have asbestos in them.

Q. And which would those be?

A. One of them is Riverside cement, and I knew that Riverside cement had asbestos, but I didn't know Zonolite had asbestos. Mono-Kote – California – Yeah, Zonolite. I really didn't know that it had Mono-Kote in it until you first contacted me.

**Summary of Some Spray Applicators' Knowledge of Monokote Fireproofing 1968-1973:**

Based upon our review of the available depositions of fireproofing applicators experienced with Monokote fireproofing during the period of 1968-1973, we have surmised the following:

- a) These fireproofing applicators, each with significant experience in the plastering and fireproofing contracting business, appear to have had no knowledge of the asbestos content of Mono-Kote MK-3, at least until the time that it was banned by EPA in 1973;
- b) They appear to have received no information from WR Grace/Zonolite at any time, about the asbestos content of Monokote, either in written or verbal information, from the sales representatives or from the company itself;
- c) They appear to have received no information from the WR Grace/Zonolite Company at any time regarding the health hazards associated with the asbestos that was in the Mono-Kote fireproofing that they were spraying.

In summary, we have found no evidence that WR Grace/Zonolite made any efforts to inform their salespeople, their approved applicators or their clients about the asbestos content of Monokote, or the health effects of asbestos. The sales representatives' clear lack of knowledge about asbestos, asbestos health effects and especially about the asbestos content of Mono-Kote MK-3, raises questions about the company's knowledge of this subject and whether the omission of this information was an oversight over the course of 3 or more years or a conscious strategy to keep this information from their customers. The lack of information on the asbestos content of Monokote within the company's sales literature, combined with the lack of knowledge of the sales force and the applicators about these issues would indicate that a business strategy and/or an intentional effort was underway to keep this information from Monokote's customers.

**Section V: W.R. Grace/Zonolite Corporate Communications**

**Findings: W.R. Grace/Zonolite Corporate Communications to Sales Representatives, Architects and an Insurance Company regarding:**

- 1) The Asbestos Content of Mono-Kote 3 (MK-3)**
- 2) Concerns Regarding Asbestos Fiber Release from MK-3**

Following our review of the literature published by WR Grace/Zonolite intended for architects and building owners regarding the properties of MK-3, and (specifically the omission of information relating to the asbestos content of that fireproofing product); our review of depositions of WR Grace Sales Representatives and approved MK-3 applicators (that also showed an apparent lack of knowledge regarding the asbestos content of MK-3), we were interested in learning what information was coming from Grace's Building Products Division regarding these issues. Specifically, we wanted to know what information and or directions were being passed along to the sales force, and what information was being presented to architectural firms when they made inquiries regarding the two questions cited above.

To facilitate this inquiry, we requested plaintiffs' counsel to provide us access to their database of Grace communications on these, and any related subjects. While we had access to the entire database, we focused our search on communications that were either directed to the sales force or to architects/building owners who were making inquiries about MK-3 and asbestos content.

**This information, along with the earlier research presented in this report, was purposely identified to help answer the overarching questions regarding exactly what building owners knew about asbestos in (Mono-Kote MK-3) fireproofing and asbestos contamination in their buildings; when did they know it; and how did they find out?**

Specifically, we wanted to know what they were being told by WR Grace's Building Products Division when they made inquiries, and what Grace Corporate were telling their Sales Representatives to tell building owners and architects when they received inquiries. The results of our investigation are presented below and cite two general classifications of documents: Documents internal to WR Grace/Zonolite and those external communications, addressed to building owners, their architects and/or representatives. The documents are presented in chronological order ranging from 1969 to 1986.



**1) 10/14/69 WR Grace (external) Correspondence to Architect,  
Melville Praeger, President, Morell-Brown, Inc  
New York, New York**

This is the first of many letters WR Grace wrote to architects in response to their inquiries about the properties of Mono-Kote and its asbestos content. Grace uses this opportunity to explicitly state that there is a "small amount of asbestos.....asbestos fibers are 'locked-in' the mass, .....there is no airborne dust....it has an extremely high resistance to dusting and flaking due to air erosion."

**2) 3/23/70 WR Grace (external) Correspondence to Architect,  
Leroy D. Schickedanz, Skidmore, Owings & Merrill  
New York, New York**

This correspondence was in reply to the architect's 3/16/70 regarding the asbestos content of "your cementitious fireproofing."

"Mono Kote is essentially a low density plaster which includes among its ingredients approximately 11% asbestos by weight. Mono-Kote is mixed and placed through a conventional plaster mixer and run in the form of a wet slurry which, of course means the asbestos particles are firmly incorporated in the cementitious mix."

**3) 4/9/70 WR Grace (internal) Correspondence to Regional Managers  
From Thomas F. Egan**

This correspondence is from WR Grace/Zonolite's National Fire Protection Product Manager, Thomas F. Egan where he outlines the response that sales representatives regarding increasing reports in the media regarding "...the pollution hazard of asbestos in sprayed fiber fireproofing."

"Developments in New York in the last week have brought the pollution hazard of asbestos in sprayed fiber fireproofing to national attention. I refer to a recent speech by Representative Richard Ottinger, New York, and the cover article of ENGINEERING NEWS RECORD, April 2, 1970, "Does Sprayed Asbestos Cause Lung Cancer? .....Be very alert to the lawsuits over this health hazard. Sell the advantages of cementitious and that the fiber is locked in the mix. Push very hard on the air erosion in the plenum and the present danger of sprayed fibers being blown through the air distribution system. This is no time to be gentle, timid or really too diplomatic. You must move quickly."

**4) 7/16/70 WR Grace (internal) memo to "All Salesmen, Central Region"**  
**From J.A. McEachern**

"I think it would be a good idea for each of you as you make your calls to point out to architects, plastering and fireproofing contractors, general contractors and building officials that Zonolite Mono Kote is not a sprayed asbestos fiber product and does not contaminate the atmosphere nor does it cause lung cancer."

**5) 12/7/70 WR Grace (external) correspondence to Royal Globe Insurance (Mr., Ray Caboor)**  
**From William J. Bourke, District Manager, and Thomas F. Egan**

"I have been made aware of your concern over the possible hazards of the use of sprayed fireproofing.....1) Mono-Kote has only 10% by weight asbestos.....2) It is wet mixed, pumped and sprayed, 3) It has a definite set containing approximately 60% gypsum and "locks" the fiber in the hardened mass, 4) The in-place density is assured and provides tested on-erosion hardness for use in its plenums."

**6) 2/2/71 WR Grace (internal) memo to: "Regional Managers, District Managers, Sales Representatives, Architectural Representatives"**  
**From Thomas F. Egan, Subject: Mono-Kote Promotion Format 1971**

"I want to outline now what I spoke on so that it's clear as to what will be expected this year. 1) Design Profession- Architects, engineers and spec writers are confused.....You must aggressively sell Mono-Kote on its positive features- cementitious, assured density, hardness, non-dusting, etc.."

**7) 2/1/77 WR Grace (internal) correspondence to "ZONOLITE Sales Organization"**  
**Subject: "Concerns of Health Hazards >From In-Place Asbestos Containing Construction Materials"**

"Prior to mid-1973, MONOKOTE (MK-3) was formulated with 10% to 14% commercial asbestos. However, because in-place MONOKOTE is a hard plaster-like material, it is our opinion that in-place MK-3 poses no health hazard to building occupants."

8) 5/6/80 WR Grace (internal) memo to S.A. Magnacca  
From M. W. Read  
Subject: "Summary of Asbestos Concern Meeting"

"A considerable amount of press over the last couple of months combined with the abnormal amount of telephone calls to this office requesting information and advice on the asbestos content of the various fireproofing products, prompted this in-house get together; so that we could discuss the area in which we are responding to the inquiries, and what suggestions, if any we should or could be making.

There are three separate categories or issues that should be discussed or answered:

- 1) **What is the asbestos content of MK-3?** and what are our recommendations for buildings that have used MK-3 fireproofing?
- 2) What is the asbestos content of MK-5? and what is the standard response to inquiries we receive regarding MK-5?
- 3) If it is necessary to over spray or encapsulate MK-3 and MK-5, what product would we recommend, if any?

#### Conclusions

- 1) Pending approval from our legal department in Cambridge, we will be drafting a letter to reply to any inquiries about asbestos content in MK-3 **enclosing a copy of the Boyle Air Erosion test** with that standard letter.
- 3) .....We do not have any results or firm information on the sealing effects of DARAWELD C **related to reducing or inhibiting or preventing the possibility of airborne asbestos fibers coming from MK-3** or any other asbestos containing materials."

9) 3/17/83 WR Grace (external) correspondence to Nebraska Christian College (Mr. Harold Milliken)  
From Robert T. Frohlich, Manager Product Support

"This is in response to your recent inquiry to our Mr. Max Dyal concerning MONOKOTE Fireproofing (MK-3) which was used in 1969 in your College. ....

In deciding on an appropriate course of action with regard to in-place material such as this, consideration needs to be made as to the type of product used, **the physical condition of the in place material and of the accessibility of the material to physical damage and dusting.**

Because of the "setting" characteristics of this plaster-type material, we believe that the asbestos fibers are encapsulated in the matrix, and therefore not subject to release to the environment.

**If, however, the material has been damaged, or has deteriorated so that the surface is subject to dusting or flaking, consideration should be given to either: (1) Removal of the material, or (2) over spraying and sealing of the surface.**

**10) 4/2/83 WR Grace (internal) correspondence to "Zonolite Sales organization"  
From R.C. Walsh**

"There has been some publicity concerning WR Grace & Co.'s involvement in asbestos-related matters. This memorandum is to provide you some background information.

There asbestos-containing fireproofing and plaster products, which were produced in the past by CPD, were cementitious materials and were applied in we slurry form. **Because of this, they did not in our opinion pose a health problem in spite of their commercial asbestos content( which generally ranged between 12 and 19 %).** In addition, it's our opinion that, once in place, CDP's pre-1973 cementitious products do not release fibers, since the asbestos in the material is encapsulated in a binder

**11) 9/8/86 WR Grace (external) Correspondence to Washington Department of Transportation (Mr. Rex Swartz/ Asst. Safety Manager  
From W.V. Culver, District Manager**

I am writing to you regarding W.R. Grace & Co.'s Monocot (r) 3 fireproofing product.....The asbestos fibers are encapsulated in the plaster matrix, and **if undamaged**, are not subject to release into the environment."

**12) 12/19/86 WR Grace (internal/external) Memo, to :Asbestos Inquiry File  
From G. Lester**

"I've received a telephone inquiry from Sam d. Woodruff of Williams, Woodruff and Elms Architects (Ontario, Canada).....He was asking if Monokote contained asbestos at the time, and if so, what he should do about it. ....I pointed out the distinction between this product and friable fibrous material and that in the opinion of WR Grace, the product poses no hazard **when properly maintained. (Eg: avoid abrasion).**"

**Analysis:**

There appears to emerge a pattern or strategy with regards to what building owners and their architects were (and were not) being told about asbestos and Mono-Kite MK-3.

- a) There was not any formal announcement, declaration or other means of communications coming from W.R. Grace/Zonolite to Building Owners , their architects or contractors that Mono-Kote 3 (MK-3) contained asbestos. The only exception that we can find is a reference in the 1971 edition of Sweets catalog the has a section on "Pollution and Health." That section discusses that there was a "small" amount of asbestos in the fireproofing product, but that it was "lock-in" the mix. Further disclosures of this information did not appear in the 1972 or 1973 editions of Sweets.
- b) It appears that the only way an architect would/could obtain this information from WR Grace, was through a direct inquiry, which meant that many, if not most, architects did not receive this information from WR Grace.
- c) Upon inquiry, architects and building owners were told that there was a "small amount of asbestos " in the product mix, but that it was not a concern, and would not be released into the building's air, for the following reasons:

- 1) It was a "cementitious" material.

**Analysis:**

This description, is actually provided to an entire class of fireproofing materials by United Laboratories, to describe products that are cement or plaster based. Monokote MK-3, contained neither; no cement, and no plaster. The implication is that it was cement like, when in fact, the dried material met EPA's definition of Friable, "easily crushed or pulverized by hand pressure."

- 2) "The fiber is 'locked-in' the mix"

Analysis:

This is a misrepresentation of the characteristics of the MK-3. It gave architects and building owners a false sense of security that the asbestos fibers would remain in the fireproofing material, would not be released, and would not contaminate their buildings.

- 3) "There is no airborne dust,...it has an extremely high resistance to dusting and flaking due to air erosion"

Analysis:

This is a mischaracterization of this material....as evidenced by WR Grace's later warnings to building owners in their 1980's correspondence that the material would not dust or release fibers....as long as it was well-maintained, was not deteriorated or damaged.

- 4) The Boyle Air Erosion Tests confirm zero air erosion at wind velocities over 100 mph.

Analysis:

These tests, performed in the 1960's were never designed to, and did not measure the release of asbestos fibers from the surface of the in-place fireproofing when subjected to high velocity winds. WR Grace did however, present their results to building owners and architects, clearly implying that was the case.

- 5) Subsequent to the EPA's ban on asbestos in spray-applied fireproofing in the summer of 1973, WR Grace began to modify it's response to building owner and architect's inquiries, regarding the potential release of asbestos fibers from MK-3, although those responses oscillated from the original claims of the fibers being "locked-in" to warnings that the fibers could now be released if the fireproofing was abraded, damaged, or in poor condition.

In summary, it appears from the documents reviewed that the sales organization at W.R. Grace was the driving force behind what building owners were and were not being told. Concerns of competition, market share and sales were the primary theme, and the information that building owners did and did not receive appeared to be dictated almost exclusively by those concerns, and not what the economic or health impacts to the building owners and those occupants would be.

### **Conclusions and Opinions**

This report has been developed in an effort to answer a number of general and specific questions regarding building owners, their architects and WR Grace/Zonolite Division's Mono-Kote MK-3 fireproofing.

#### **The general questions are:**

- 1) When did building owners discover that their buildings contained asbestos construction products?
- 2) When did building owners discover that their buildings may have become contaminated with asbestos fibers?
- 3) How did they make those discoveries?

#### **Opinion:**

It has been my experience at Halliwell Engineering Associates, Inc., and it is my professional opinion that building owners have become generally aware of asbestos and its health hazards from the media, over time. They may have also learned that certain classes of building products may have contained asbestos at one time in their manufacture, and some building owners may have learned that their building products contained asbestos by locating and contacting the manufacturers of those products.

However, it is also my experience and opinion that many building owners did not learn that their building products contained asbestos, until they had them sampled and analyzed for asbestos content, usually at the time prior to large scale renovations.

It is also my experience and opinion that most building owners did not discover asbestos contamination in their buildings, until those buildings underwent asbestos surveys and sampling.

Finally, it is my experience and opinion that building owners, as a class, learned about asbestos in their building products at varying times; many when they undertook large scale renovations that would involve disturbing large amounts of asbestos containing building materials.

Those projects were driven by many different variables, depending upon the building, it's use, age, ownership and resources.

**The specific questions are:**

- 1) What did building owners know about asbestos in their Mono-Kote MK-3 Fireproofing?
- 2) What did building owners know about asbestos contamination from Mono-Kote MK-3 Fireproofing?
- 3) When did they find out?
- 4) How did they learn about it?

Our research, as described in this report, has indicated that there was a clear omission of information by W.R. Grace/Zonolite regarding the asbestos content of Monokote MK-3 fireproofing. The withholding of that information is apparent in both the written product literature of Monokote MK-3, and the knowledge of the sales representatives representing the product to building owners as well as the applicators installing it in the buildings. The withholding of that information continued to take place up until the product was banned by EPA in July of 1973.

The significance of this omission is that architects, who relied upon the sales representatives and the sales literature to provide them with accurate and complete product information, could specify this product, for installation into buildings, believing that the product was free of asbestos content.

Many building owners who were uninformed by W.R. Grace about the asbestos content of their Mono-Kote MK-3 fireproofing, would continue to be unaware of it's hazards for years until some point in time when it would be discovered by sampling and/or surveys.



Further, when architects did make inquiries about the asbestos content of Mono-Kote MK-3 they were told that the product would not release asbestos fibers into the building because:

- a) The material was cementitious, and
- b) The asbestos was "locked-in" the mix
- c) There would be no dusting or flaking as proven by wind erosion test of over 100 mph.

In the end, all of these statements, meant to reassure building owners and architects that this product would not result in the release of asbestos fibers into the finished building, proved to be either misleading, or false.

The "cementitious" description is a classification provided by UL for cement and plaster based fireproofing products. Earlier Mono-kote formulations (MK-1, MK-2) contained Portland cement, but MK-3 contained neither cement or plaster, although UL continued the designation.

The in-place MK-3 product is easily abraded, damaged, and can often be classified by EPA's definition of "Friable" meaning easily crushed by hand pressure."

The claim that the asbestos fibers are "locked-in" the matrix is not true, as evidenced by the elevated airborne concentrations of asbestos fibers when in-place MK-3 is disturbed or removed.

The claim that the product would experience no dusting or surface erosion as a result of 100 mph wind velocities is misleading, as this test never analyzed the release of asbestos fibers from the fireproofing surface during the high wind speeds, just gross weight loss of the entire sample.

These mischaracterizations, misleading and false assertions to architects and building owners about the asbestos properties of Mono-Kote MK-3 would lead them to believe that the asbestos fibers in the MK-3 fireproofing would not be released from the product, and would not contaminate the buildings.

Further, these assertions continued for over 10 years after the EPA banned the product. Up until the mid 1980's W.R. Grace continued to make these false assertions to building owners regarding asbestos fibers being "locked-in" the fireproofing mix.

In summary, it is my opinion that these omissions of critical product and health hazard information, along with the false and mis-leading statements about the fireproofing's ability to contain the asbestos fibers, resulted in many building owners not learning about the asbestos content of their (MK-3) fireproofing for decades after W.R. Grace knew, and resulted in the delay of building owners learning of their building's asbestos contamination from Mono-Kote MK-3 fireproofing for similar periods, if not longer.

A handwritten signature in black ink, appearing to read "Jack L. Halliwell". The signature is fluid and cursive, with a long horizontal stroke at the beginning.

Jack L. Halliwell, P.E.  
President  
Halliwell Engineering Associates, Inc.  
January 17, 2007

## **Appendices**

- 1) Qualifications of Jack L. Halliwell, P.E.**
- 2) Reference Materials**

**JACK L. HALLIWELL, P.E.**

*President, Halliwell Engineering Associates, Inc.*

*Principal Environmental Engineer*

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Jack Halliwell is the president of Halliwell Engineering Associates, Inc., an environmental and engineering firm founded in 1954. The firm has two primary areas of engineering expertise which Mr. Halliwell manages personally: Indoor Environmental Engineering and Building Diagnostics. One specialty of the company is providing

**EDUCATION:**

B.S. Business Management -  
University of Colorado, 1972

B.S. Civil and Environmental Engineering -  
University of Rhode Island, 1975

**TECHNICAL TRAINING:**

**Asbestos Management:**

Procedures and Practices for Asbestos Abatement; Tufts University

Advanced Supervision of Asbestos Abatement; Georgia Institute of Technology

AHERA Inspecting Building for Asbestos-Containing Materials; Georgia Institute of Technology

AHERA Managing Asbestos in Buildings; Georgia Institute of Technology

Asbestos Respiratory Protection; Mayhew Environmental Training Associates

Designer: Asbestos Abatement Procedures and Practices; Institute for Environmental Education

Asbestos Replacement and Control; Electric Power Research Institute

**Building HVAC and Envelope Systems:**

Technical Development Program; Carrier Corp.

Plumbing, Hydraulics, and Mechanical Systems in Buildings; Bell and Gossett

Building Commissioning Practices; American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)

Building Science-Corp: BSC: Building Envelope and IAQ Seminars

### **PROFESSIONAL REGISTRATIONS:**

Mr. Halliwell has been licensed as a registered professional engineer since 1981. He currently is licensed to practice engineering in the following states:

Arkansas	Maine	New York	Virginia
Arizona	Maryland	Pennsylvania	
Colorado	Massachusetts	Rhode Island	
Connecticut	New Hampshire	South Carolina	
Florida	New Jersey	Vermont	

### **ASBESTOS CERTIFICATIONS:**

Mr. Halliwell has been certified and licensed as an asbestos consultant in the following states:

Florida	New York	New Jersey
Maine	Rhode Island	Wisconsin
New Hampshire	South Carolina	

### **WORK EXPERIENCE:**

Mr. Halliwell has over 20 years of experience in Environmental Engineering with almost all of that time spent concentrating on asbestos management issues. He has successfully integrated the Facilities Engineering Group at Halliwell Engineering Associates (HEA) into the Environmental Services Division, to address the specialized problems presented in the management of asbestos in large and complex facilities. Through the combination of facilities engineering, industrial hygiene and construction management services, Mr. Halliwell has developed an in-house team of professionals that provide expert management of asbestos control programs and large renovation/abatement projects.

Mr. Halliwell and his team have been requested to provide these services to Colleges, Universities, Hospitals, Hotels, Entertainment Facilities, Commercial Offices, Insurance Companies, Corporate Facilities, Large Shopping Malls, Utility Companies, Defense Contractors and NASA.

### **PROFESSIONAL SOCIETIES/ORGANIZATIONS:**

#### *Past and Present Memberships:*

Environmental Information Association  
(formerly the National Asbestos Council)  
(Mr. Halliwell served on the board of directors from 1989-1993)

National Society of Professional Engineers

American Society of Hospital Engineers

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)

Whate Building Owners and Their Architects Knew about Asbestos .doc  
Halliwell Engineering Associates, Inc.

International Society of Indoor Air Quality and Climate

National Institute of Buildings Sciences (NIBS)

American Conference of Governmental Industrial Hygienists, Inc.

**MEMBERSHIP ON TECHNICAL COMMITTEES:**

USEPA's Office of Research and Development Task Force on unique problems of asbestos abatement in tall and occupied buildings

Georgia Tech Research Institute's Whitepaper Development of Asbestos Project Monitor Training for EPA's Model Accreditation Program

National Institute of Building Sciences, Technical Committee on Developing NIBS Guidance Manual: Asbestos Operations and Maintenance Work Practices (325 page Technical Manual)

National Asbestos Council (Now EIA), Editorial Review Committee, and Chairman of Technical Sessions Review Committee

USEPA's Indoor Air Division Building Air Quality Alliance Program Compliance Committee

National Institute of Building Science Technical Committee on revising NIBS Model Asbestos Abatement Specifications

ASHRAE's SSPC 62: Committee to Revise Ventilation Standards for Acceptable Indoor Air Quality

**IAQ REVIEW BOARDS, PROGRAMS AND PROCEDURES:**

National Realty Committee, Review panel for OSHA's proposed IAQ Regulations

International Conference of Shopping Centers, Development of IAQ Policies

National Association of Real Estate Investment Managers, Development of IAQ Programs and Procedures

State of Maryland, Editorial Review Board, Technical Bulletins on IAQ Management

Indoor Air Review Magazine, Review panel of OSHA's proposed IAQ Rule

USEPA's Workshop on Developing National IAQ Training Programs

Indoor Environment Review (formerly Indoor Air Review), Member, Editorial Advisory Board

**COURSES TAUGHT AT EPA-APPROVED TRAINING CENTERS  
FOR ASBESTOS MANAGEMENT:**

(Georgia Institute of Technology)

- “Asbestos Abatement in Live Mechanical Electrical Rooms”
- “Asbestos Abatement in Industrial Settings”
- “Asbestos Abatement in Occupied Facilities: A Systematic Approach”
- “How to Write an Effective Corporate Asbestos Policy”

**PAPERS PRESENTED TO PROFESSIONAL SOCIETIES AND ORGANIZATIONS:**

- “Smart Asbestos Management; Capitalizing on EPA’s new Agenda”  
Presented at the American Hospital Association’s annual meeting
- “Professional Management for Large and Complex Asbestos Removal Projects”  
Presented at a 2-day professional development seminar  
at the annual meeting of the National Asbestos Council
- “Asbestos Directions for the 90’s”  
Presented at the annual meeting of the Association of Physical Plant  
Administrators (APPA)
- “How to Develop an Environmental Master Plan”  
Presented at the National Commercial Buildings Show
- “Indoor Air Quality Surveys: How to be Effective and Efficient”  
Presented at Indoor Environment ‘93
- “Managing IAQ During Building Renovations”  
Presented at Indoor Environment ‘94
- “ASHRAE’s New Ventilation Standard: A Critical Analysis”  
“Healthy Building Management: 101”  
Presented at Indoor Environment ‘95
- “HVAC Systems and Surveys: Inspecting HVAC Systems for Acceptable  
Indoor Air Quality”  
Presented to the Associated Specialists in Cleaning and Restoration
- “Microbial Contamination in the Building Environment: Part I”  
Presented at Indoor Environment ‘96
- “ASHRAE Standard 62-1989R, Ventilation Standard for Acceptable  
Indoor Air Quality - Summary Report on the Current Draft of 62R”  
Presented to the National Realty Committee’s Indoor Air Quality  
Working Group  
Presented at Indoor Environment ‘96, and  
Presented to the General Services Administration
- “How to Design, Construct and Operate Buildings for Acceptable  
Indoor Air Quality”  
Presented at NeoCon ‘96

**PUBLISHED ARTICLES:**

- "What Design Professionals Need to Know About Abatement"  
Asbestos Issues Magazine, July, 1989
- "Corporate Asbestos Policy"  
Asbestos Issues Magazine, August, 1989
- "Managing the Abatement Team"  
Asbestos Issues Magazine, September, 1989
- "The Bottom Line on Occupied Building Abatement"  
Asbestos Abatement Magazine, May/June, 1990
- "The Art of Renovation and Replacement"  
Asbestos Issues Magazine, September, 1990
- "Asbestos Management: How to Capitalize on EPA's New Agenda"  
Health Facilities Management Magazine, August, 1991
- "Second Opinion is Wise for Asbestos-Related Problems"  
Tri-State Real Estate Journal, January, 1992
- "Indoor Air Quality Surveys: How to be Effective and Efficient"  
Indoor Air Review, Winter, 1994
- "ASHRAE 62R Update – Basic Models, O&M Section added to Public Review Draft"  
Indoor Environment Review, August, 1996.
- "ASHRAE 62R - Update Defining the Roles of Ventilation for Acceptable Indoor Air Quality"  
Indoor Environment Review, September, 1996.
- "ASHRAE 62R Update - ASHRAE 62R: Three Proposed Methods for Selecting Minimum Ventilation Rates"  
Indoor Environment Review, October, 1996.
- "ASHRAE 62R Update - Construction and System Start-up"  
Indoor Environment Review, November, 1996.
- "ASHRAE 62R Update - Operating and Maintenance Procedures"  
Indoor Environment Review, January, 1997.
- "ASHRAE 62R Update - "Public Review Process"  
Indoor Environment Review, March, 1997.

**HONORS, AWARDS, CITATIONS,  
AND LETTERS OF APPRECIATION FROM:**

National Asbestos Council, U.S. Environmental Protection Agency, National Institute of Building Sciences, Georgia Institute of Technology, American Hospital Association, Association of Physical Plant Administrators, 1995 Recipient of IAQ Publications' "Industry Person of the Year" Award



**Section II: Appendix of Architectural/Engineering/Construction Publications 1968-1973**

New Yorker Magazine

Architectural Record

Progressive Architecture

Architectural Forum

Engineering News Record

Progressive Architecture Magazine

Sweets Catalog

**Section III and IV: Appendix of Depositions and Documents used:**

**Depositions of Sales Representatives**

- 1) Deposition of Wilfred Archambo, D.N. CV-90-0387282 S (dated, April 24, 1995)  
Connecticut Mutual Life Insurance Company (Plaintiff)  
Vs.  
W.R. Grace & Co. and  
W.R. Grace & Co. – Conn. (Defendants)
- 2) Deposition of Allan Mann, File No. CT 89-019829 (dated, August 8, 1991)  
The County of Hennepin (Plaintiff)  
Vs.  
W.R. Grace & Co. – Conn (individually and as successor – in-interest to Zonolite Company and Western Mineral Products Company); Adolfson & Peterson, Inc. and X, Y and Z (Defendants)
- 3) Deposition of Charles William Guenther, No. 581479 (dated September 15, 1989)  
Clayton Center Associates, a Limited Partnership, and Centor Company, as General Partner for Clayton Center Associates, and Centor Company, a corporation, (Plaintiffs)  
Vs.  
W.R. Grace & Company (Defendant)
- 4) Deposition of Samuel Lee Templeton, # 82-32142-14 (dated, January 4, 1984)  
Greenville County School District (Plaintiff)  
Vs.  
United States Gypsum Company, W.R. Grace Company, National Gypsum Company and Proko Industries, Inc. (Defendants)
- 5) Deposition of Elijah David Bossier, C.A. No. 88-5165 Section “A”(2)  
(dated June 15, 1989)  
Security Homestead Association (Plaintiff)  
Vs.  
W.R. Grace & Company (Defendant)
- 6) Deposition of Harold D. Bishop, No. 89-3022 (dated May 13, 1992)  
State Farm Mutual Automobile Insurance Company (Plaintiff)  
Vs.  
W.R. Grace & Company (Defendant)

- 7) Deposition of P.J. Lyons, Case No. 89-3022 (dated May 19, 1992)  
State Farm Mutual Automobile Insurance Company (Plaintiff)  
Vs.  
W.R. Grace & Company (Defendant)
- 8) Deposition of Glen Carpenter C. A. No. 85-1936 (dated September 21, 1987)  
Jeannine A. Galbreath, Individually and as Personal Representative of the Estate of  
Ward C. Galbreath (Plaintiff)  
Vs.  
United States Gypsum Company, et. al. (Defendants)

### **Depositions of Spray Applicators'**

- 1) Deposition of Hal Y. Garrrett, C.A. No. 87-3147-17 (dated, June 2, 1989\_  
Liberty Life Insurance Company (Plaintiff)  
Vs.  
W.R. Grace & Co., and  
W.R. Grace & C. – Conn. (Defendants)
- 2) Deposition of Creighton Crowe, C.A. No. 6:91-2591-20 (dated, September 3, 1992)  
The First Savings Bank, F.S.B., (Plaintiff)  
Vs.  
W.R. Grace & Co., Conn. (Defendant)
- 2) Deposition of Richard Connor, C.A. No. C-88-516-D (dated, July 10, 1990)  
The Cheshire Medical Center (Plaintiff)  
Vs.  
W.R. Grace & Co., Conn. (Defendant)
- 3) Deposition of Ross Lee, C.A. No. 440-317 (dated, February 21, 1992)  
Los Angeles Unified School District, (Plaintiff)  
Vs.  
Owens-Corning Fiberglas Corporation, et.al. (Defendant)

## Section V: Appendix W.R. Grace Internal Documents

03/13/70 No Subject (MEMO -- Egan-TF)  
 03/23/70 No Subject (LETTER -- Culver-WV)  
 05/20/70 Asbestos in Sprayed Fireproofing (MEMO -- Egan-TF)  
 05/20/71 No Subject (LETTER -- Getz-RE)  
 09/27/72 Mono-Kote (LETTER -- Meyer-ME)  
 02/08/73 People's National Bank (LETTER -- Culver-WV)  
 07/22/76 Customer Questions Concerning the Asbestos Content in MONOKOTE (MEMO -- Williams-BR)  
 02/01/77 Concerns of Health Hazards from In-Place Asbestos Containing Construction Materials (Reference also memo of January 25, 1977 re Cafco Advertisement.) (MEMO -- Williams-BR)  
 02/23/77 Government Specifications/Asbestos (MEMO -- Merther-RA)  
 03/01/77 Operating Guide XII (GUIDE -- W.R. Grace & Co. Construction Products Division)  
 03/04/77 Zonolite Acoustical Plaster (LETTER -- Merther-RA)  
 03/09/77 No Subject (LETTER -- Merther-RA)  
 03/16/77 No Subject (LETTER -- Merther-RA)  
 04/12/77 Ceilings Containing Asbestos (LETTER -- DeBastian-RO)  
 06/16/77 No Subject (LETTER -- Merther-RA)  
 06/21/77 No Subject (MEMO -- Harris-S)  
 07/07/77 VA Hospital (MEMO -- Merther-RA)  
 09/25/78 Monokote Fireproofing/Vail Medical Sciences Building (LETTER -- Merther-RA)  
 09/29/78 Letters sent to people concerned about products formerly sold by this Division which contained asbestos (MEMO -- Merther-RA)  
 10/13/78 No Subject (LETTER -- Williams-BR)  
 10/27/78 Letter concerning MONOKOTE Cementitious Fireproofing applied in 1970 (LETTER -- Merther-RA)  
 12/04/78 Zonolite Monokote Fireproofing (LETTER -- Merther-RA)  
 12/18/78 Recent phone conversation concerning sprayed insulation and acoustical materials which may contain asbestos (LETTER -- Merther-RA)  
 12/20/78 Ingredient of MONOKOTE Cementitious Fireproofing, as manufactured by the Construction Products Division of W.R. Grace & Co. (LETTER -- Merther-RA)  
 02/02/79 Sample letter sent to an architect in response to questions concerning asbestos-containing materials (MEMO -- Merther-RA)  
 03/23/79 Zonolite Monokote Type MK-3 (LETTER -- Merther-RA)  
 04/18/79 ZONOLITE MONOKOTE Cementitious Fireproofing supplied by this company prior to mid-1973 contained approximately 12% by weight of asbestos fibers (LETTER -- Merther-RA)  
 05/10/79 No Subject (LETTER -- Unknown)  
 08/10/79 No Subject (LETTER -- Heintz-H)  
 12/18/79 Request for Technical Service (REPORT -- Korenberg-PE)  
 04/09/80 Request for Technical Service (REPORT -- Unknown)

05/06/80 Summary of Asbestos Concern Meeting (MEMO -- Read-MW)  
05/28/80 Our File No: 009 C 53402 Our Insured: MacArthur Co. Claimant: Karl W. Busse Date of Loss: 01/08/75 (LETTER -- Monahan-B)  
09/12/80 ROMODA LTD (MEMO -- Bushell-NF)  
04/07/81 Request for ingredients of MonoKote (LETTER -- Abers-D)  
11/24/81 MK-3/Bldg. #5 (LETTER -- Merther-RA)  
03/04/82 No Subject (LETTER -- Feit-TP)  
06/07/82 Letter to follow up on 6/7/82 conversation concerning MONOKOTE fireproofing (LETTER -- Ericson-RC)  
02/28/83 Customer Inquiry Re: Tremolite (MEMO -- Venuti-S)  
03/08/83 Monokote Cementitious Fireproofing (LETTER -- Frohlich-RT)  
03/15/83 No Subject (LETTER -- Frohlich-RT)  
03/17/83 Inquiry concerning MONOKOTE Fireproofing (MK-3) which was used in 1969 at Nebraska Christian College (LETTER -- Frohlich-RT)  
03/24/83 No Subject (LETTER -- Frohlich-RT)  
04/20/83 Letter to Zonolite salespeople regarding response to questions involving asbestos/tremolite (LETTER -- Walsh-RC)  
04/20/83 No Subject (LETTER -- Walsh-RC)  
04/20/83 No Subject (MEMO -- Walsh-RC)  
07/06/83 ICG Operating Guide XII - Coordination of Statements to Customers Concerning the Toxicological Status of our Products (MEMO -- Vining-RM)  
07/11/83 Remodeling and Renovation work planned for McCarron Airport, Las Vegas, Nevada (LETTER -- Frohlich-RT)  
12/09/83 Encapsulation of Friable Asbestos Containing Materials (MEMO -- Parker-JB)  
02/16/84 No Subject (REPORT -- Unknown)  
02/04/86 No Subject (LETTER -- Hamilton-JS)  
04/07/86 Customer Letters (MEMO -- Hamilton-JS)  
05/14/86 No Subject (LETTER -- Pollock-BD)  
08/20/86 No Subject (LETTER -- Lester-G, Vining-RM)  
09/08/86 No Subject (LETTER -- Culver-WV)  
12/19/86 No Subject (MEMO -- Lester-G)  
11/09/1934 Confirming Dr. Elkins visit to Dewey and Almy Chemical Company (LETTER -- Bowditch-M)  
02/17/1938 Asbestosis (LETTER -- Bowditch-M)  
06/26/57 Letter from Bureau of Mines - asbestos in Libby ore (LETTER -- Gaudin-AM)  
07/03/62 Steel City Industries, Inc. Patent License Agreement (REPORT -- W.R. Grace & Co)  
01/25/66 Maryland Casualty Company (MEMO -- Bleich-RA)  
08/01/67 Descriptions to be used on bills of lading on truckload and less truckload shipments via 'for hire' truck lines (MEMO -- Spangler-WW)  
09/14/67 H.R. 12913; A BILL (Regulation -- PATTEN)  
11/25/67 Lilas D. Welch (LETTER -- Larrick-SY)  
12/05/67 Answers to Interrogatories; Lilas D. Welch, Claimant v. Zonolite Division of W.R. Grace & Company, Employer, and Maryland Casualty Company (Legal Document -- Unknown)  
Whate Building Owners and Their Architects Knew about Asbestos .doc  
Halliwell Engineering Associates, Inc.

12/05/67 Report of trip to Kalispell, Montana (MEMO -- Dugan-CF)  
 01/09/68 Report of meeting with E. Fenner, director of J-M's Department of Environmental Control (MEMO -- Sterrett-RW)  
 02/22/68 Lilas D. Welch (LETTER -- Larrick-SY)  
 06/27/68 Visit by Industrial Hygienists and Engineers from the U.S. Public Health Service (MEMO -- Lovick-ED)  
 07/10/68 List of active and inactive employees for asbestos study (LETTER -- Lynch-JR)  
 07/18/68 Request from U.S. Public Health Service for list of employees (MEMO -- Vining-RM)  
 07/18/68 No Subject (MEMO -- Lovick-ED)  
 07/25/68 No Subject (MEMO -- Sterrett-RW)  
 07/26/68 Department of Health, Education, and Welfare, Public Health Service (MEMO -- Sterrett-RW)  
 08/01/68 Refusing to release list of employees (LETTER -- Lovick-ED)  
 11/09/68 Social Security Administration Study (MEMO -- Lovick-ED)  
 11/14/68 Clipping from the Wall Street Journal about the harmful effects of asbestos (LETTER -- Bushell-NF)  
 12/13/68 Insitu and Environmental Dust Control for Vermiculite Mining and Expanding Operations (MEMO -- Schneider-RE)  
 03/03/69 Insitu and Environmental Dust Control for Vermiculite Mining and Expanding Operations (MEMO -- Schneider-RE)  
 03/20/69 Robert E. Cohenour (MEMO -- Lovick-ED)  
 04/15/69 Discussion with Lovick on employee health approach (Notes -- Unknown)  
 12/01/69 Prime reasons to get asbestos out of Mono-Kote (MEMO -- Egan-TF)  
 12/02/69 Asbestos (MEMO -- Egan-TF)  
 12/16/69 Radiological Interpretation of X-ray Annual Follow-up, Libby (MEMO -- Park-LE)  
 05/20/70 Cafco Type D C/F (MEMO -- Egan-TF)  
 05/21/70 No Subject (MEMO -- Feit-TP)  
 06/01/70 Meeting in Winnipeg with Whittaker (MEMO -- Egan-TF)  
 06/01/70 Understanding of the issues and the course of events concerning the 'asbestos' pollution (MEMO -- Egan-TF)  
 12/07/70 I.B.M. Building (LETTER -- Bourke-WJ)  
 03/12/71 Trip Report (MEMO -- Bragg-RJ)  
 03/16/71 Rederal Aviation Admin. Hampton, Georgia (LETTER -- Dietrick-TE)  
 05/13/71 Product Description Mono-Kote (MEMO -- Lord-SJ)  
 06/30/71 Back-Charges 622 Third Avenue (LETTER -- Guarino-FL)  
 07/23/71 Bay Are(sic) Air Pollution (MEMO -- Pickthall-TW)  
 07/27/71 Kaiser Hosp. - So. S.F. (Notes -- Taylor-JE)  
 08/06/71 Bay Area Air Pollution Control (MEMO -- Pickthall-TW)  
 09/21/71 CPD Vermiculite Expansion Plants - Pollution Control (MEMO -- Lafferty-RH)  
 10/04/71 No Subject (LETTER -- Greer-JH)  
 11/01/71 Weedsport - Notice of Violation, State of New York Department of Labor Division of Industrial Safety Service (MEMO -- Eaton-FW)  
 01/13/72 Proposed EPA Standards (MEMO -- Duecker-HC)  
 02/07/72 Arizona State Industrial Commission (MEMO -- Burnham-RK)  
 02/29/72 No Subject (MEMO -- Stewart-OF)  
 03/27/72 Washington Trust Building, Spokane (LETTER -- CULVER-WV)  
 06/05/72 Asbestos Update (MEMO -- Eschenbach-HA)  
 Whate Building Owners and Their Architects Knew about Asbestos .doc  
 Halliwell Engineering Associates, Inc.

07/11/72 MK (Manufacturing document, Specification -- Ericson-RC)  
 08/01/72 No Subject (LETTER -- Eaton-FW)  
 08/02/72 MK-3 changeover (LETTER -- Feit-TP)  
 08/29/72 EPA (MEMO -- Feit-TP)  
 10/31/72 No Subject (LETTER -- Pickthall-TW)  
 11/14/72 Safety Survey - Easthampton (MEMO -- Eschenbach-HA)  
 12/08/72 Health & Safety Survey - Denver Plant (MEMO -- Kostic-P)  
 12/13/72 Warning Signs - Asbestos Exposures (MEMO -- Kostic-P)  
 02/20/73 Southern-Florida-Texas Sales Meeting Minutes (MEMO -- Westbrook-JL)  
 03/30/73 EPA signing 'National Emissions Standards for Hazardous Air Pollutants' (MEMO -- Feit-TP)  
 05/10/73 Crescent Office Park, Nassau Mall, Levittown, N.Y. (LETTER -- Vliet-EV)  
 05/24/73 No Subject (LETTER -- Culver-WV)  
 05/29/73 Salwas Memorial Hosp. (Notes -- Salisbury-D)  
 06/08/73 Weekly Activities Report Week Ending June 1, 1973 (MEMO -- Culver-WV)  
 06/21/73 MK for Southern Kansas (INVOICE -- Les & Lee)

07/02/73 Mono-Kote #3 (MEMO -- Draper-LD)  
 07/09/73 MK# for Hitchins in New Zealand (MEMO -- Brown-HA)  
 08/31/73 EPA Regulations Applying to Spraying of Texture Paints and Acoustical Plasters (MEMO -- Williams-BR)  
 09/01/73 Fire Protection (ADVERTISEMENT -- W.R. Grace & Co, The Canadian Architect)  
 09/25/73 Asbestos (MEMO -- Patrasek-EJ)  
 10/29/73 No Subject (LETTER -- Hollis-LP)  
 10/08/74 Monokote 3 in Canada (MEMO -- Williams-BR)  
 06/02/76 MONO-KOTE (MEMO -- Favorito-OM)  
 07/22/76 Customer Questions Concerning the Asbestos Content in MONOKOTE (MEMO -- Williams-BR)  
 09/27/76 No Subject (LETTER -- Locke-RH)  
 12/15/76 Asbestos Miranda Statement (MEMO -- Blessington-BA)  
 02/23/77 Government Specifications/Asbestos (MEMO -- Merther-RA)  
 03/16/77 No Subject (LETTER -- Merther-RA)  
 03/30/77 Epidemiological Study (MEMO -- Eschenbach-HA)  
 03/31/77 Policy Position on Statements Regarding Tremolite in Monokote, Zonolite 3300 and Mine Sealant (LETTER -- Williams-BR)  
 04/13/77 Speech used for Southern Florida Regional Sales Meeting (April 13-15, 1977 and Terra-Lite Sales Meeting (May 2-5, 1977) (SPEECH -- Unknown)  
 06/20/77 Caution Statement on Vermiculite Product Bags (MEMO -- Blessington-BA)  
 02/15/78 Employee Information Handout on Tremolite and Health (MEMO -- Wood-ES)  
 02/22/78 Employee Information Handout on Tremolite and Health (MEMO -- Locke-RH)  
 07/20/78 KLCB Radio Asbestos Inquiries (MEMO -- Eschenbach-HA)  
 05/28/80 Our File No: 009 C 53402 Our Insured: MacArthur Co. Claimant: Karl W. Busse Date of Loss: 01/08/75 (LETTER -- Monahan-B)  
 09/12/80 ROMODA LTD (MEMO -- Bushell-NF)  
 Whate Building Owners and Their Architects Knew about Asbestos .doc  
 Halliwell Engineering Associates, Inc.

11/26/80 NIOSH Meeting November 24, 1980 (MEMO -- Locke-RH)  
03/25/81 No Subject (REPORT -- Burnham-RK)  
07/31/85 Newspaper articles - 'City U.'s 42nd St. Library Shut to Clean Up Asbestos Fibers' (MEMO -- J.P.G.)  
05/02/86 No Subject (LETTER -- Gebert-FE)  
01/14/90 W.R. Grace - 'Asbestos Litigation' (LETTER -- Poe-C)

03/23/70 No Subject (LETTER -- Culver-WV)  
04/09/70 No Subject (MEMO -- Egan-TF)  
05/20/70 Asbestos in Sprayed Fireproofing (MEMO -- Egan-TF)  
07/23/70 State of Illinois, Construction Safety Inspection Unit Meeting (MEMO -- Bourke-WJ)  
08/05/70 No Subject (MEMO -- Egan-TF)  
08/07/70 Competitive Non-Asbestos Fireproofing (Press Release / Bulletin -- Egan-TF)  
03/12/71 Trip Report (MEMO -- Bragg-RJ)  
04/01/71 No Subject (LETTER -- Culver-WV)  
05/20/71 No Subject (LETTER -- Getz-RE)  
03/20/72 California Bill (MEMO -- CHW)  
05/26/72 Revisions to draft of regulations of asbestos (LETTER -- Williams-BR, Feit-TP)  
05/30/72 No Subject (REPORT -- Unknown)  
06/01/72 Environmental Protection Agency Proposed Standards for Air Emissions of Asbestos (MEMO -- Feit-TP)  
06/08/72 Environmental Protection Agency Proposed Standards for Air Emissions of Asbestos (MEMO -- Feit-TP)  
06/12/72 The Particle Atlas (Notes -- Unknown)  
12/11/72 Invention Disclosure No. 1067 (MEMO -- Parker-CE)  
12/19/72 EPA (MEMO -- Feit-TP)  
02/08/73 People's National Bank (LETTER -- Culver-WV)  
09/27/73 MK-3; MK-4 (MEMO -- Vining-RM)  
09/27/76 No Subject (LETTER -- Locke-RH)  
02/01/77 Concerns of Health Hazards from In-Place Asbestos Containing Construction Materials (Reference also memo of January 25, 1977 re Cafco Advertisement.) (MEMO -- Williams-BR)  
03/09/77 No Subject (LETTER -- Merther-RA)  
06/21/77 No Subject (MEMO -- Harris-S)  
07/07/77 VA Hospital (MEMO -- Merther-RA)  
10/27/78 Letter concerning MONOKOTE Cementitious Fireproofing applied in 1970 (LETTER - Merther-RA)  
11/08/78 Public Hearing (REPORT -- Feit-TP)  
12/04/78 Zonolite Monokote Fireproofing (LETTER -- Merther-RA)  
03/04/82 No Subject (LETTER -- Feit-TP)  
06/07/82 Letter to follow up on 6/7/82 conversation concerning MONOKOTE fireproofing (LETTER -- Ericson-RC)  
03/17/83 Inquiry concerning MONOKOTE Fireproofing (MK-3) which was used in 1969 at Nebraska Christian College (LETTER -- Frohlich-RT)  
04/20/83 Letter to Zonolite salespeople regarding response to questions involving asbestos/tremolite (LETTER -- Walsh-RC)  
04/20/83 No Subject (LETTER -- Walsh-RC)  
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04/20/83 No Subject (MEMO -- Walsh-RC)  
 07/11/83 Remodeling and Renovation work planned for McCarron Airport, Las Vegas, Nevada (LETTER -- Frohlich-RT)  
 12/09/83 Encapsulation of Friable Asbestos Containing Materials (MEMO -- Parker-JB)  
 02/04/86 No Subject (LETTER -- Hamilton-JS)  
 04/07/86 Customer Letters (MEMO -- Hamilton-JS)  
 08/20/86 No Subject (LETTER -- Lester-G, Vining-RM)  
 09/08/86 No Subject (LETTER -- Culver-WV)  
 Undated No Subject (Notes -- Unknown)

08/16/63 Facts and Fantasies: Speech on Zonolite Water Repellent Masonry Fill given at the Fall Campaign Sales Meeting  
 in Covington, Ky. on August 16, 1963 (REPORT -- Perrine-EL)  
 01/20/66 Fireproofing materials applied by the 'dry hose' technique, a summary of commercially available products  
 (REPORT -- Bragg-RJ, Payment-WR)  
 10/05/66 Addition - R.H. Macy & Co., Mission, Kansas (LETTER -- Ottinger-JC)  
 04/01/68 Summary of Plaster and Fireproofing Committee Meeting 3/19/1968 (REPORT -- Plaster and Fireproofing Committee)  
 08/28/68 MK3; ETH; Sales (MEMO -- Topp-C)  
 09/06/68 Regional Building Trade Magazine Advertising 1969 (MEMO -- Strand-PR)  
 11/14/68 Clipping from the Wall Street Journal about the harmful effects of asbestos (LETTER -- Bushell-NF)  
 02/01/69 Advertising Bulletin #856 Re: New Circulars and Displays List (LETTER -- Strand-PR)  
 04/01/69 Chicago-American Articles (LETTER -- Egan-TF)  
 04/01/69 No Subject (MEMO -- Egan-TF)  
 06/26/69 No Subject (MEMO -- Egan-TF)  
 08/12/69 1970 Zonolite Marketing Statement - Mono-Kote Fireproofing (REPORT -- Unknown)  
 12/01/69 Prime reasons to get asbestos out of Mono-Kote (MEMO -- Egan-TF)  
 12/02/69 Asbestos (MEMO -- Egan-TF)  
 12/08/69 My Memo Dated December 2, 1969 (MEMO -- Egan-TF)  
 12/10/69 No Subject (LETTER -- Selikoff-IJ)  
 12/24/69 Publicity Bulletin #860 (LETTER -- Strand-PR)  
 01/07/70 1970 Product Code Master Book (MEMO -- Muccini-RA)  
 03/09/70 Post Office Construction (MEMO -- Egan-TF)  
 03/10/70 Substantially improved formulation on Mono-Kote in near future, elimination of asbestos in formulation (LETTER -- Strand-PR)  
 03/13/70 No Subject (MEMO -- Egan-TF)  
 03/23/70 No Subject (LETTER -- Culver-WV)  
 04/03/70 No Subject (MEMO -- Egan-TF)  
 04/06/70 No Subject (LETTER -- Olson-WB)  
 04/09/70 No Subject (MEMO -- Egan-TF)  
 04/10/70 Sprayed Fire Retardants (MEMO -- Vining-RM)  
 04/10/70 No Subject (LETTER -- Rickles-RN)  
 04/14/70 No Subject (MEMO -- Strand-PR)  
 04/17/70 No Subject (MEMO -- Egan-TF)  
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04/28/70 No Subject (MEMO -- Egan-TF)  
 04/29/70 Monthly Report Excerpts (MEMO -- Williams-BR)  
 05/01/70 NEW CIRCULARS AND DISPLAYS LIST (LETTER -- Cass-C)  
 05/01/70 Advertising Bulletin #867 Re: New Circulars and Displays List (LETTER -- Cass-C)  
 05/06/70 Are You Listening to the Rumbblings; (LETTER -- Egan-TF)  
 05/20/70 Cafco Type D C/F (MEMO -- Egan-TF)  
 05/20/70 Asbestos in Sprayed Fireproofing (MEMO -- Egan-TF)  
 05/21/70 No Subject (MEMO -- Feit-TP)  
 05/25/70 No Subject (LETTER -- Holmes-BH)  
 05/31/70 Western and Central Region Sales Meeting May 31 - June 2, 1970 (MINUTES -- Unknown)  
 06/05/70 Monthly Situation Report May, 1970 (MEMO -- Cintani-J)  
 06/11/70 No Subject (MEMO -- Egan-TF)  
 07/01/70 'Mono-Kote Fireproofing' (MK 125); A Sound-Slide Program 1970 (Unknown -- Root-A, TR Productions)  
 07/06/70 Monthly Report June, 1970 (MEMO -- Strand-PR)  
 07/13/70 Official Magazine, American Medical Assn., Article in July, 1970 TODAY'S HEALTH entitled 'A Cancer Threat Greater Than Cigarettes' (MEMO -- Bourke-WJ)  
 07/16/70 No Subject (MEMO -- McEachern-JA)  
 07/23/70 State of Illinois, Construction Safety Inspection Unit Meeting (MEMO -- Bourke-WJ)  
 08/05/70 No Subject (MEMO -- Egan-TF)  
 08/07/70 Competitive Non-Asbestos Fireproofing (Press Release / Bulletin -- Egan-TF)  
 08/13/70 Monthly Report for July (MEMO -- Hollis-LP)  
 08/23/70 Excerpts from June Monthly Reports (REPORT -- Unknown)  
 09/01/70 'Asbestos; Friend or Foe;' (Journal Article -- Environmental Science & Technology)  
 09/28/70 Mono-Kote IV Advertising (MEMO -- Strand-PR)  
 10/01/70 No Subject (LETTER -- Campbell-DG)  
 10/01/70 MONO-KOTE Applicator Agreement (MEMO -- Favorito-OM)  
 10/14/70 Mono-Kote Status Meeting (MEMO -- Egan-TF)  
 10/20/70 Recent developments in Mono-Kote formulations (MEMO -- Egan-TF)  
 10/20/70 Managers' Meeting; Sprayed Fireproofing Mono-Kote (REPORT -- Egan-TF)  
 12/07/70 I.B.M. Building (LETTER -- Bourke-WJ)  
 12/11/70 No Subject (MEMO -- Strand-PR)  
 01/26/71 No Subject (LETTER -- Newman-DE)  
 02/02/71 Mono-Kote Promotion Format 1971 (MEMO -- Egan-TF)  
 02/03/71 Mono Kote Requirements 1971 (MEMO -- McDougall-JN)  
 02/16/71 Individual Effort - Bulletin #8 (Press Release / Bulletin -- Egan-TF)  
 03/05/71 Agenda for NY Meeting on Mono-Kote 1st Draft (MEMO -- Egan-TF)  
 03/22/71 No Subject (LETTER -- McNally-WR)  
 04/01/71 No Subject (LETTER -- Culver-WV)  
 04/02/71 No Subject (LETTER -- Rogers-WK)  
 04/02/71 Non-Asbestos-Fireproofing Product Zonolite Mono-Kote IV (LETTER -- Rogers-WK)  
 04/30/71 Product Managers (REPORT -- Unknown)  
 04/30/71 Product Managers (REPORT -- Unknown)  
 05/14/71 No Subject (REPORT -- Egan-TF)  
 05/19/71 No Subject (LETTER -- Culver-WV)  
 06/10/71 Monthly Excerpts (REPORT -- Unknown)  
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07/01/71 Advertising Bulletin #879 Re: Circulars and Displays (LETTER -- Campbell-DG)  
 07/26/71 Phone call from Williams - Monokote (NOTES -- Unknown)  
 07/27/71 Eastern Region Monthly Report - June, 1971 (REPORT -- Rogers-WK)  
 10/29/71 Northeast District Mono-Kote Sales and Product Problems (MEMO -- Williams-BR)  
 12/01/71 Minutes of Meeting Plaster & Fireproofing Committee (MINUTES -- Unknown)  
 01/01/72 Publicity Items for September through December, 1971 (LETTER -- Strand-PR)  
 01/04/72 No Subject (MEMO -- Culver-WV)  
 02/07/72 No Subject (MEMO -- Bruce)  
 02/15/72 NESHAP L.A. (TRANSCRIPT -- Zimmer Reporting Service)  
 02/23/72 Environmental Protection Agency Hearing (MEMO -- Feit-TP)  
 02/24/72 Relationship between relative humidity and MONO-Kote MK-4 strength (MEMO -- Korenberg-PE)  
 03/01/72 'Application of Sprayed Inorganic Fiber Containing Asbestos- Occupational Health Hazards', American Industrial Hygiene Association Journal, p.178-191 (Journal Article -- Reitze-WB, Nicholson-WJ, Holaday-DA, Selikoff-IJ)  
 05/04/72 Standard Oil Building (Chicago) MK Advertising (MEMO -- Feit-TP)  
 06/09/72 MONO-KOTE Manual (MEMO -- Gaidis-JM)  
 10/20/72 Fireproofing Applicators Northeast District (REPORT -- Unknown)  
 11/10/72 Mono-Kote 5 Announcement (MEMO -- DeBastian-RO)  
 11/14/72 Zonolite Overseas Licensees (MEMO -- Brown-HA)  
 01/01/73 Advertising Bulletin #898 Re: Zonolite (LETTER -- Strand-PR)  
 01/01/73 Advertising Bulletin #898 Re: Zonolite Literature and Displays (LETTER -- Strand-PR)  
 01/06/73 Monokote 5 (MEMO -- Feit-TP)  
 02/20/73 Southern-Florida-Texas Sales Meeting Minutes (MEMO -- Westbrook-JL)  
 03/01/73 Advertising Bulletin #899 Re: Phone Book Advertising (LETTER -- Strand-PR)  
 03/09/73 Mono-Kote Pricing Southern Region (MEMO -- Lowe-CR)  
 04/25/73 Hyde - Quebec (MEMO -- McKague-JV)  
 06/11/73 Enoree MONOKOTE Production (MK-5) (MEMO -- Feit-TP)  
 09/27/73 MK-3; MK-4 (MEMO -- Vining-RM)  
 04/25/75 Vermiculite Sales by Customer 1970 & 1971 (MEMO -- McCord-WF)  
 07/22/76 Customer Questions Concerning the Asbestos Content in MONOKOTE (MEMO -- Williams-BR)  
 02/01/77 Concerns of Health Hazards from In-Place Asbestos Containing Construction Materials (Reference also memo of January 25, 1977 re Cafco Advertisement.) (MEMO -- Williams-BR)  
 04/20/83 No Subject (LETTER -- Walsh-RC)  
 12/09/83 Encapsulation of Friable Asbestos Containing Materials (MEMO -- Parker-JB)  
 02/04/86 No Subject (LETTER -- Hamilton-JS)  
 Undated How to sell effectively to architects (Chart / Graph / Drawing -- Unknown)  
 Undated Excerpts from Grace Annual Reports 1970-1972 (REPORT -- Unknown)  
 Undated Partial Listing Zonolite Monokote Applications Washington, D.C. (REPORT -- Unknown)  
 Undated Zonolite Full Line 1972 Proposed Promotion Program (REPORT -- Unknown)  
 Undated 1970 Zonolite Marketing Statement Mono-Kote Fireproofing (REPORT -- Unknown)  
 Undated Zonolite Sales and Inventory Coding Manual 1971 (REPORT -- Unknown)  
 Undated St. Louis Construction News and Reviews (BROCHURE -- Unknown)

10/29/84 No Subject (MEMO -- Walsh-RC)

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03/19/85 Task Force Meeting - Air Monitoring Test Methods (MEMO -- Warren-HL, USG)  
04/09/85 No Subject (LETTER -- Walsh-RC)  
04/16/85 Governmental Affairs Activities and Plans - March, 1985 (MEMO -- Washington #142-1, Bush-JS)  
09/04/85 City of Greenville, et al., v. W.R. Grace & Co.; Responses of W.R. Grace & Co. TO PLAINTIFFS'  
INTERROGATORIES (Legal Document -- Unknown)  
10/16/85 California sets standards for asbestos assessment in schools; SAFE BUILDING ALLIANCE SUPPORTS  
LEGISLATIVE TREND (Press Release / Bulletin -- Safe Building Alliance, Welch-JF, Tieger-CC)  
02/05/86 Agenda - Friday, February 7, 1986 (AGENDA -- Bettacchi-RJ)  
04/07/86 Customer Letters (MEMO -- Hamilton-JS)  
04/11/86 Quarterly Report - Asbestos-Related Issues (MEMO -- Bettacchi-RJ)  
09/08/86 No Subject (LETTER -- Culver-WV)  
12/05/86 JPG Budget Review (REPORT -- RCW, BLD)  
12/19/86 No Subject (MEMO -- Lester-G)  
05/13/87 Meeting with Chesire Medical Center, Keene, NH (MEMO -- Hamilton-JS)  
11/13/87 Motion for Expedited Briefing and Oral Argument; Safe Building Alliance v. Environmental Protection Agency  
(Legal Document -- Unknown)  
01/22/88 Certificate as to parties, rulings and related cases (Other -- Unknown)

11/27/1928 Zonolite patent #1,693,015 (PATENT -- Babor-JA, Estabrooke-WL)  
01/01/51 Zonolite Brand Vermiculite (ADVERTISEMENT -- Zonolite Company)  
01/01/51 How To Do IT; Installing all Forms of Zonolite Insulations (ADVERTISEMENT -- Western Mineral Products Company)  
01/01/54 No Subject (ADVERTISEMENT -- Zonolite Company)  
01/01/55 Time Tells the Story (ADVERTISEMENT -- Zonolite Company)  
01/01/59 Zonolite Acoustical Plastic (ADVERTISEMENT -- Zonolite Company)  
01/01/59 Mono-Kote Direct-to-Steel Fireproofing (ADVERTISEMENT -- Zonolite Company)  
01/01/60 Lightweight Plaster Systems (ADVERTISEMENT -- Zonolite)  
10/01/60 New Zonolite Mono-Kote (ADVERTISEMENT -- Zonolite Company)  
01/01/61 Vermiculite Lightweight Plaster Systems (ADVERTISEMENT -- Zonolite Company)  
08/01/61 'Zonolite' Mono-Kote Direct-to-Steel Fire Protection (ADVERTISEMENT -- Zonolite Company)  
03/01/62 Direct-to-Steel Fire Protection (ADVERTISEMENT -- Zonolite/ Mono-Kote Data Sheet)  
03/01/62 'Zonolite' Mono-Kote Direct-to-Steel Fire Protection (ADVERTISEMENT -- Zonolite Company)  
05/01/63 Direct-to-Steel Fire Protection (ADVERTISEMENT -- Zonolite/ Mono-Kote Data Sheet)  
07/01/63 Plastering Industries (ADVERTISEMENT -- Fuller & Smith & Ross Inc)  
10/01/63 Architectural Record (ADVERTISEMENT -- Fuller & Smith & Ross Inc)  
01/01/64 Zonolite Mono-Kote (ADVERTISEMENT -- Zonolite Division, W.R. Grace & Co)  
03/31/64 Mono-Kote (Resistance to Air Erosion) (Press Release / Bulletin -- Sterrett-RW, DLG)

06/01/64 Direct-to-Steel Fire Protection (ADVERTISEMENT -- Zonolite Division, W.R. Grace & Co)

11/01/65 Direct-to-Steel Fire Protection (ADVERTISEMENT -- Zonolite Division, W.R. Grace & Co)

07/01/66 Zonolite Mono-Kote Direct-to-Steel Fire Protection; MK-112 (ADVERTISEMENT -- Zonolite Division)

08/28/68 MK3; ETH; Sales (MEMO -- Topp-C)

04/28/69 No Subject (LETTER -- Egan-TF)

01/01/70 Spray Fireproofing Facts (ADVERTISEMENT -- W.R. Grace & Co)

01/01/70 Mono-Kote Direct-to-Steel Fireproofing (ADVERTISEMENT -- Zonolite)

04/14/70 No Subject (MEMO -- Strand-PR)

06/03/70 No Subject (MEMO -- Vining-RM)

09/28/70 Mono-Kote IV Advertising (ADVERTISEMENT -- Zonolite, W.R. Grace & Co)

02/01/71 Zonolite Mono-Kote - 4 Cementitious Spray Fireproofing Formulated Without Asbestos (ADVERTISEMENT -- Zonolite Construction Products Division)

05/27/71 No Subject (Report -- Egan-TF, Feit-TP)

01/01/72 Zonolite Mono-Kote (ADVERTISEMENT -- W.R. Grace & Co, Construction Products Division)

10/01/72 Zonolite Announces Monokote 5 - The Improved Asbestos-Free Plaster-Type Fireproofing Material (Press Release / Bulletin -- Feit-TP)

10/23/72 No Subject (LETTER -- Egan-TF)

11/01/72 Product Performance -they're getting it with Zonolite Mono-Kote Fire Protection. (ADVERTISEMENT -- W.R. Grace & Co, Zonolite, WALLS & CEILING Magazines)

12/01/72 Success Story At Century City (REPORT -- Construction Project Digest, W.R. Grace & Co)

01/01/73 No Subject (Sweets -- Sweet's Architectural Catalog File)

04/17/73 Environmental Protection Agency (Press Release / Bulletin -- Feit-TP)

01/01/74 No Subject (Sweets -- Sweet's Architectural Catalog File)

01/01/74 Monokote Fireproofing delivers everything it promises; (ADVERTISEMENT -- W.R. Grace & Co)

01/01/75 No Subject (Sweets -- Sweet's Architectural Catalog File)

01/01/89 Retro-guard: Why are more architects, consultants, and building owners choosing Retro-Guard for replacement fireproofing? (ADVERTISEMENT -- W.R. Grace & Co)

Undated No Subject (ADVERTISEMENT -- Unknown)

Undated Zonolite Mono-Kote (ADVERTISEMENT -- Unknown)

Undated Step by Step Application of Zonolite Plaster in the Prudential Building, Chicago, Illinois (ADVERTISEMENT -- Zonolite)

Undated Vermiculite Lightweight Systems for Fire Protection and Sound Absorption (ADVERTISEMENT -- Zonolite)

Undated Retro-Guard (ADVERTISEMENT -- W.R. Grace & Co)

Undated Monokote Fireproofing... The Spray-applied that stays applied; (ADVERTISEMENT -- W.R. Grace & Co)

Undated Domestic Chemicals Product Guide (BROCHURE -- W.R. Grace & Co)

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Undated St. Louis Construction News and Reviews (BROCHURE -- Unknown)

10/21/63 Erosion of Mono-Kote When Subjected to High Velocity Air (MEMO -- Perrine-EL)  
 11/04/63 Erosion of Mono-Kote When Subjected to High Velocity Air (MEMO -- Perrine-EL)  
 11/13/63 Erosion of Mono-Kote When Subjected to High Velocity Air (MEMO -- Gilchrist-DL)  
 03/31/64 Mono-Kote (Resistance to Air Erosion) (Press Release / Bulletin -- Sterrett-RW, DLG)  
 04/30/64 No Subject (REPORT -- Olson-RWT)  
 06/01/64 Direct-to-Steel Fire Protection (ADVERTISEMENT -- Zonolite Division, W.R. Grace & Co)  
 07/03/64 Mono-Kote (Resistance to Air Erosion) (Press Release / Bulletin -- Zonolite Division, DLG)  
 06/01/65 Specifying Sprayed Fireproofing; The Construction Specifier, Vol. 18, No. 1, p.G1-G15; (Journal Article -- Library of Congress)  
 06/18/65 No Subject (LETTER -- Barron-LA)  
 10/08/65 GSA Specifications (MEMO -- Malter-M)  
 11/01/65 Direct-to-Steel Fire Protection (ADVERTISEMENT -- Zonolite Division, W.R. Grace & Co)  
 11/29/65 No Subject (LETTER -- Barron-LA)  
 07/01/66 Zonolite Mono-Kote Direct-to-Steel Fire Protection; MK-112 (ADVERTISEMENT -- Zonolite Division)  
 01/14/67 Air Velocity Surface Erosion (Dusting ) Test on Mono-Kote Plaster Material (REPORT - - Boyle Engineering Laboratories Co.)  
 01/16/67 Effect of High Velocity Air Upon the Surface of Mono-Kote Material Having a Dry Bulk Density of 16.85 lbs. per cu ft; (REPORT -- Boyle Engineering Laboratories Co.)  
 01/16/67 Effect of High Velocity Air Upon the Surface of Mono-Kote Having a Dry Bulk Density of 16.85 lbs per cu. ft; (REPORT -- Boyle Engineering Laboratories Co.)  
 09/21/67 General Motors Bldg., New York City (MEMO -- Morell-Brown)  
 03/01/68 Equipment, Materials and Methods; Vermiculite Fireproofing (ADVERTISEMENT -- Civil Engineering - ASCE)  
 04/01/68 MK-112; Zonolite Mono-Kote Direct-To-Steel Fire Protection (REPORT -- Unknown)  
 11/01/68 PLASTER PRODUCTS (REPORT -- PAYMENT-WR)  
 11/14/68 Clipping from the Wall Street Journal about the harmful effects of asbestos (LETTER -- Bushell-NF)  
 01/01/69 Mono-Kote Spray-on Fireproofing (ADVERTISEMENT -- Zonolite Construction Products Division)  
 04/28/69 No Subject (LETTER -- Egan-TF)  
 05/08/69 No Subject (MEMO -- Egan-TF)  
 10/01/69 No Subject (ADVERTISEMENT -- Zonolite Construction Products Division)  
 10/14/69 Mt. Sinai (LETTER -- Ottinger-JC)  
 01/01/70 Zonolite / Data Sheet (ADVERTISEMENT -- Zonolite, W.R. Grace & Co)  
 01/01/70 Spray Fireproofing Facts (ADVERTISEMENT -- W.R. Grace & Co)  
 04/09/70 No Subject (MEMO -- Egan-TF)  
 05/01/70 'Sprayed Asbestos Viewed With Growing Alarm' (Journal Article -- Walls & Ceiling Magazines)

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05/01/70 Available Data (Notes -- Unknown)  
 05/20/70 No Subject (LETTER -- Cooper-WC, Tabershaw-Cooper Associates)  
 05/20/70 Asbestos in Sprayed Fireproofing (MEMO -- Egan-TF)  
 05/31/70 Western and Central Region Sales Meeting May 31 - June 2, 1970 (MINUTES -- Unknown)  
 07/06/70 I. Field Operation - Mixing and Spraying, etc. II. Long-term pollution effect from in-place monokote. (REPORT -- Unknown)  
 07/13/70 Official Magazine, American Medical Assn., Article in July, 1970 TODAY'S HEALTH entitled 'A Cancer Threat Greater Than Cigarettes' (MEMO -- Bourke-WJ)  
 07/17/70 Preliminary examination of air moving systems lined with cementitious fireproofing materials; (MEMO -- Tabershaw-Cooper Associates)  
 07/21/70 Safety Requirements for Working With Asbestos-Containing Materials on Construction Job Sites in Illinois (REPORT -- Illinois Department of Labor, Division of Safety Inspection & Education)  
 08/04/70 Meeting of June 17, 1970 on the Health Hazard of Asbestos Fiber (LETTER -- Parks-RL)  
 08/13/70 Mono-Kote Data for Health Safety Program (MEMO -- Schneider-RE)  
 08/20/70 Research & Development Program for Asbestos-Free Mono-Kote (Report -- Construction Products Division)  
 08/31/70 Report of the Philadelphia Department of Public Health AD HOC Committee on Environmental and Occupational Hazards of Spray Asbestos Fibers (REPORT -- Philadelphia Department of Public Health)  
 09/18/70 'Application of Sprayed Fireproofing Materials' (LETTER -- Jenne-LC)  
 10/06/70 Dusting Test Conducted on Zonolite Mono-Kote Fireproofing Material (REPORT -- Bowser-Morner Testing Laboratories)  
 10/08/70 Fireproofing for the Philadelphia Electric Company and Fidelity Girard Buildings (LETTER -- Parks-RL)  
 12/11/70 No Subject (MEMO -- Culver-WV)  
 02/01/71 An act to add Chapter 17 (commencing with Section 25999) to Division 20 of the Health and Safety Code, relating to air duct systems. (REPORT -- Unknown)  
 02/23/71 Federal Aviation Administration 299 Woolsey Road, Hampton, GA (LETTER -- Beavers-GW)  
 03/16/71 Federal Aviation Admin. Hampton, Georgia (LETTER -- Dietrick-TE)  
 04/01/71 House Bill 927 (LETTER -- Culver-WV)  
 05/20/71 No Subject (LETTER -- Getz-RE)  
 07/27/71 Kaiser Hosp. - So. S.F. (Notes -- Taylor-JE)  
 10/01/71 Zonolite Fireproofing Mono-Kote (ADVERTISEMENT -- W.R. Grace & Co, Construction Products Division)  
 12/09/71 Wieboldt's - Lincoln Mall (LETTER -- Bourke-WJ)  
 01/01/72 Zonolite Mono-Kote (ADVERTISEMENT -- W.R. Grace & Co, Construction Products Division)  
 01/17/72 AB314--Asbestos Used in Air Duct Systems (LETTER -- Steffan-W)  
 02/15/72 NESHAP L.A. (TRANSCRIPT -- Zimmer Reporting Service)  
 03/20/72 California Bill (MEMO -- CHW)  
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06/20/72 Federal Office Building (Chicago) (MEMO -- Feit-TP)  
11/13/72 Standard Oil-SYLVAGARD Federal Bldg. - THOROSEAL (MEMO -- Korenberg-PE)  
01/01/73 No Subject (Sweets -- Sweet's Architectural Catalog File)  
02/08/73 People's National Bank (LETTER -- Culver-WV)  
09/01/73 Fire Protection (ADVERTISEMENT -- W.R. Grace & Co, The Canadian Architect)  
10/30/73 MK5 Physical Testing (MEMO -- Feit-TP)  
01/01/74 No Subject (Sweets -- Sweet's Architectural Catalog File)  
02/25/77 MONTHLY STATUS REPORT, FIREPROOFING (MEMO -- PAYMENT-WR)  
05/06/80 Summary of Asbestos Concern Meeting (MEMO -- Read-MW)  
12/21/83 Test Method for Determining the Damageability & Subsequent Fiber Release of Sprayed  
on Asbestos Containing  
Products (MEMO -- Hamilton-TE)